Vol. 1066 Number 3

OFFICIAL GAZETTE

of the

UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

PATENTS

May 20, 1986

PUBLISHED WEEKLY BY AUTHORITY OF CONGRESS

U.S.
DEPARTMENT
OF COMMERCE

Patent
and
Trademark
Office

OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

May 20, 1986 Volume 1066 Number 3

CONTENTS

	Page
Patent and Trademark Office Notices	
Patent Cooperation Treaty (PCT) Information	1066 OG 18
Notice of Maintenance Fees Payable	1066 OG 18
Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees	1066 OG 19
Reissue Applications Filed	1066 OG 19
Requests for Reexaminations Filed	1066 OG 19
Notice of Examination for Registration Tuesday, Oct. 14, 1986	1066 OG 20
Patent Certificates of Correction	1066 OG 22
Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries	1066 OG 23
Condition of Patent Applications	1066 OG 24
Reexaminations	1047
Reissue Patents Granted (32,149)	1049
Patents Granted	
General and Mechanical (4,589,146)	1053
Chemical (4,589,884)	1311
Electrical (4,590,326)	1433
Design Patents Granted (283,844)	1537
Index of Patentees	PI 1
Indices of Reissue, Reexamination and Design	PI 55
Classification of	
Patents (Including Reissues and Reexaminations)	PI 59
Designs	PI 62
Geographical Index of Residence of Inventors	
Patents (Including Reissues)	PI 63
Designs	PI 64
Change of Address Form and Subscription Order Form	Back Page

The following are mailed under direction of the Superintendent of Documents, Government Printing Office, Washington, D.C., 20402, to whom all subscriptions should be made payable and all communications addressed:

THE OFFICIAL GAZETTE (PATENT SECTION), issued weekly.
THE OFFICIAL GAZETTE (TRADEMARK SECTION), issued weekly.
GENERAL INFORMATION concerning PATENTS.
GENERAL INFORMATION concerning TRADEMARKS.

COPIES OF PATENTS are furnished by the Patent and Trademark Office at $1.50 each; PLANT PATENTS in color, $6.00 each; copies of TRADEMARKS at $1.00 each. Address orders to the Commissioner of Patents and Trademarks, Washington, D.C., 20231.

Printing authorized by Section 11(a)3 of Title 35, U.S. Code P.T.O.

PATENT AND TRADEMARK OFFICE NOTICES

Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1052 O.G. 52 on Mar. 26, 1985.

For use of the European Patent Office as Searching Authority for PCT applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 52 on Sept. 28, 1982.

Certain domestic PCT fees for international applications have been changed effective Oct. 5, 1985 in the rule change notice titled "Revision of Patent Fees" published at 1057 O.G. 24 on Aug. 20, 1985.

The Search fee of the European Patent Office has been changed as of Feb. 9, 1986 and is announced in the *Official Gazette* at 1061 O.G. 30 on Dec. 31, 1985.

International PCT fees have been changed effective Jan. 1, 1986 and were announced in the *Official Gazette* at 1061 O.G. 30 on Dec. 31, 1985.

Note that the amount of the international search fee for the European Patent Office and the amounts of the International PCT fees will change effective June 1, 1986. For information on these fee changes see the notice appearing in the *Official Gazette* at 1065 O.G. 41 on Apr. 29, 1986.

The current schedule of PCT fees is as follows:

Transmittal fee:	170.00
Search Fee	
U.S. Patent and Trademark Office as Searching Authority	
—No corresponding prior U.S. national application filed	420.00
—Corresponding prior U.S. national application filed	250.00
European Patent Office as Searching Authority	
if paid before June 1, 1986	830.00
if paid on or after June 1, 1986	930.00
International fees	
Basic fee (first 30 pages):	
if paid before June 1, 1986	325.00
if paid on or after June 1, 1986	375.00
Basic Supplemental fee (for each page over 30):	
if paid before June 1, 1986	6.00
if paid on or after June 1, 1986	7.00
Designation fee for the first 10 national or regional offices:	
if paid before June 1, 1986	80.00
if paid on or after June 1, 1986	90.00
Designation fee for 11th and subsequent designations	No charge

DONALD J. QUIGG,
Mar. 31, 1986. *Assistant Secretary and Commissioner of Patents and Trademarks.*

Notice of Maintenance Fees Payable

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on applications filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Oct. 5, 1985. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the grant.

Attention is drawn to the patents which were issued on May 17, 1983, for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,383,335 through 4,384,368
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months are set forth in 37 CFR 1.20(e) and (h), as amended effective Oct. 5, 1985, which are reproduced below:

37 CFR §1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant . . . $ 225.00"

"(h) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:
By a small entity (§1.9(f)) . . . . . $ 225.00
By other than a small entity . . . . . $ 450.00"

The amounts of the surcharges as amended effective Oct. 5, 1985, are set forth in 37 CFR 1.20 (k) and (l) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982 . . . . . $ 110.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:
By a small entity (§1.9(f)) . . . . . $ 55.00
By other than a small entity . . . . . $ 110.00"

Section 1.20 paragraph (m) as amended as a result of enactment of Public Law 98-622 effective Nov. 8, 1984, is reproduced below:

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay in payment is shown to the satisfaction of the Commissioner to have been unavoidable . . . . . $ 500.00"

Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

PATENTS WHICH EXPIRED MARCH 2, 1986 DUE TO FAILURE TO PAY MAINTENANCE FEES

Patent Number	Serial Number	Issue Date
4,317,248	06/242,291	3/02/82
4,317,285	06/247,720	3/02/82
4,317,328	06/222,369	3/02/86
4,317,392	06/249,061	3/02/82
4,317,455	06/220,572	3/02/82
4,317,465	06/220,769	3/02/82
4,317,537	06/218,254	3/02/82
4,317,726	06/233,758	3/02/82
4,317,903	06/228,396	3/02/82
4,317,906	06/216,598	3/02/82
4,317,909	06/237,732	3/02/82
4,317,928	06/228,032	3/02/82
4,317,931	06/240,752	3/02/82
4,318,170	06/224,386	3/02/82

REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.19(a)).

3,922,377, Re. S.N. 824,371, Filed Jan. 23, 1986, Cl. 426/645, HEAT-PROCESSED DEHYDRATED BACTERIOLOGICALLY STABLE PORK RIND PRODUCT AND PROCESS FOR PREPARING SAME, Kenneth F. Whittle, Owner of Record: *Protein Foods (U.K.) Ltd., Tipton, England,* Attorney or Agent: Richard E. Fichter, Ex. Gp.: 132

3,979,548, Re. S.N. 828,886, Filed Feb. 13, 1986, Cl. 428/38, POLYURETHANE COATED SAFETY GLASS, Wolfgang Schafer, et al., Owner of Record: *Saint-Gobain Industries, Neuilly-sur-Seine, France,* Attorney or Agent: Norman F. Oblon, et al., Ex. Gp.: 156

3,990,753, Re. S.N. 835,810, Filed Mar. 3, 1986, Cl. 384/450, ROLLER BEARINGS COMPRISING ROLLERS WITH POSITIVE SKEW ANGLE, Erik M. Kellstrom, et al., Owner of Record: *SKF Industries, Inc., King of Prussia, Pa.,* Attorney or Agent: Eugene E. Renz, Jr., et al., Ex. Gp.: 245

4,353,086, Re. S.N. 835,555, Filed Mar. 3, 1986, Cl. 357/051, SILICON INTEGRATED CIRCUITS, Ralph J. Jaccodine, et al., Owner of Record: *Bell Telephone Laboratories, Inc., Murray Hill, N.J.,* Attorney or Agent: S. E. Hollander, et al., Ex. Gp.: 253

4,398,189, Re. S.N. 762,774, Filed Aug. 5, 1985, Cl. 340/721, LINE BUFFER SYSTEM FOR DISPLAYING MULTIPLE IMAGES IN A VIDEO GAME, John J. Pasierb, Jr., et al., Owner of Record: *Bally Manufacturing Corp., Chicago, Ill.,* Attorney or Agent: Ronald L. Wanke, et al., Ex. Gp.: 264

4,421,588, Re. S.N. 824,798, Filed Feb. 5, 1986, Cl. 156/308.2, PLASTICS ALLOY COMPOSITIONS, Glyndwr J. Davies, Owner of Record: *AEPLC, Cawston House, England,* Attorney or Agent: Peter P. Price, Ex. Gp.: 131

4,423,318, Re. S.N. 814,745, Filed Dec. 27, 1985, Cl. 235/379, TRANSACTION PROCESSING SYSTEM, Kanzen Gotou, Owner of Record: *Hitachi, Ltd., Tokyo, Japan,* Attorney or Agent: Donald R. Antonelli, et al., Ex. Gp.: 233

4,435,139, Re. S.N. 834,219, Filed Feb. 25, 1986, Cl. 418/201, SCREW ROTOR MACHINE AND ROTOR PROFILE THEREFOR, Ake Astberg, Owner of Record: *Svenska Rotor Maskiner Aktiebolag, Nacka, Sweden,* Attorney or Agent: Stephen H. Frishauf, et al., Ex. Gp.: 343

4,456,320, Re. S.N. 834,982, Filed Feb. 28, 1986, Cl. 339/94M, SEALING RING FOR AN ELECTRICAL CONNECTOR, David O. Gallusser, et al., Owner of Record: *Allied Corp., Morris Township, N.J.,* Attorney or Agent: C. D. Lacina, et al., Ex. Gp.: 322

4,456,472, Re. S.N. 832,115, Filed Feb. 24, 1986, Cl. 071/118, SYNERGISTIC HERBICIDAL COMBINATION, Bareld E. Groenwold, Owner of Record: *Stauffer Chemical Co., Westport, Conn.,* Attorney or Agent: Joel G. Ackerman, et al., Ex. Gp.: 129

4,513,829, Re. S.N. 832,312, Filed Feb. 24, 1986, Cl. 175/339, CHIP RELIEF FOR ROCK BITS, J. Randall Coates, Owner of Record: *Smith International, Inc., Newport Beach, Calif.,* Attorney or Agent: C. Russell Hale, et al., Ex. Gp.: 356

4,524,806, Re. S.N. 808,631, Filed Dec. 13, 1985, Cl. 137/856, PRESSURE VALVE FOR A COMPRESSOR, Bendt W. Romer, Owner of Record: *Danfoss A/S, Nordborg, Denmark,* Attorney or Agent: Wayne B. Easton, Ex. Gp.: 347

4,525,464, Re. S.N. 821,650, Filed Jan. 23, 1986, Cl. 501/103, CERAMIC BODY OF ZIRCONIUM DIOXIDE (ZrO_2) AND METHOD FOR ITS PREPARATION, Nils Claussen, et al., Owner of Record: *Max-Planck-Gesellschaft Zur Forderung der Wissenschaften, Gottingen, Germany,* Attorney or Agent: Peter F. Felfe, et al., Ex. Gp.: 118

4,538,832, Re. S.N. 826,352, Filed Feb. 5, 1986, Cl. 280/808, ADJUSTABLE SEAT BELT ANCHORAGE, Alexander B. Anderson, Owner of Record: *ASE (UK) Ltd., Carlisle, England,* Attorney or Agent: Robert J. Patch, Ex. Gp.: 316

4,543,065, Re. S.N. 825,989, Filed Feb. 4, 1986, Cl. 433/221, PRE-MADE REINFORCEMENT DEVICE, Geoffrey C. Bushway, Owner of Record: *Advanced Dental Technology, Inc., Las Vegas, Nev.,* Attorney or Agent: Jerry R. Seiler, et al., Ex. Gp.: 333

REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b)).

3,799,427, Reexam. No. 90/000,978, Requested: Mar. 31, 1986, Cl. 383/103, DEGASING VALVE FOR HERMETICALLY SEALED FLEXIBLE CON-

TAINERS AND A CONTAINER PROVIDED WITH THE VALVE, Luigi Goglio, Owner of Record: *Crescent Holdings N.V., Curacao, Netherlands,* Attorney or Agent: Steinberg & Raskin, Ex. Gp.: 240, Requester: Fres-Co System USA, Inc., Telford, Pa.

4,109,791, Reexam. No. 90/000,970, Requested: Mar. 17, 1986, Cl. 206/506, NESTABLE AND STACKABLE CONTAINER ASSEMBLY WITH IMPROVED BAIL STRUCTURES AND MOLDED PLASTIC, Stuart A. Clipson, Owner of Record: *Ecko Products, Inc., Wheeling, Ill.,* Attorney or Agent: C. B. Fagan, Ex. Gp.: 240, Requester: Pinckney Molded Plastics, Inc., Howell, Mich.

4,286,925, Reexam. No. 90/000,980, Requested: Apr. 3, 1986, Cl. 417/12, CONTROL CIRCUITS FOR SHUTTING OFF THE ELECTRICAL POWER TO A LIQUID WELL PUMP, Thomas R. Standish, Owner of Record: *Delta-X Corp., Houston, Tex.,* Attorney or Agent: Jack W. Hayden, Ex. Gp.: 340, Requester: Owner

4,479,380, Reexam. No. 90/000,982, Requested: Apr. 10, 1986, Cl. 73/61.1, OPEN-TUBULAR SUPERCRITICAL FLUID CHROMATOGRAPHY, Milo Novotney, Owner of Record: *Brigham Young University, Provo, Utah,* Attorney or Agent: Charles E. Miller, Ex. Gp.: 260, Requester: Suprex Corp., Pittsburgh, Pa.

4,507,674, Reexam. No. 90/000,969, Requested: Mar. 17, 1986, Cl. 357/30, BACKSIDE ILLUMINATED BLOCKED IMPURITY BAND INFRARED DETECTOR, Steven D. Gaalema, Owner of Record: *Hughes Aircraft Co., Los Angeles, Calif.,* Attorney or Agent: Joseph E. Szabo, Ex. Gp.: 250, Requester: Rockwell International Corp., Thousand Oaks, Calif.

4,556,658, Reexam. No. 90/000,981, Requested: Apr. 7, 1986, Cl. 514/254, 7-AMINO-A-CYCLOPROPYL-6,8-DIFLUORO-1,4-DIHYDRO-4-OXO-QUINOLINE-3-CARBOXYLIC ACIDS AND ANTI-BACTERIAL AGENTS CONTAINING THESE COMPOUNDS, Klaus Grohe, et al., Owner of Record: *Bayer Aktiengesellschaft, Leverkusen, Germany,* Attorney or Agent: Sprung, Horn, et al., Ex. Gp.: 120, Requester: Fitzpatrick, Cella, et al., New York, N.Y.

Notice of Examination for Registration
Tuesday October 14, 1986

Pursuant to the provisions of 37 C.F.R. §§10.5, 10.6 and 10.7, an examination for persons seeking registration before the United States Patent and Trademark Office as patent attorneys and agents will be held on *Tuesday, Oct. 14, 1986.* The deadline for filing applications along with the $250 fee and all necessary showings required by 37 CFR §§7(a) and (b) is *July 31, 1986.*

With the exception of those persons who actively served four years in the examining corps of the Patent and Trademark Office for whom the examination is waived, all persons recognized for practice before the Patent and Trademark Office in patent cases must pursuant to the noted rules, pass the examination. Note: those passing the examination do not qualify for recognition for practice before the Patent and Trademark Office in trademark cases. Recognition for practice in trademark cases is governed by 37 C.F.R. §10.14, which does not require the passing of an examination.

37 C.F.R. §10.6(d) provides, in part, that, "[A]ny officer or employee of the United States who is disqualified by statute (18 U.S.C. 203, 205) from practicing as an attorney or agent in proceedings or other matters before Government departments or agencies, may not be registered to practice before the Office... [but,] an officer or employee whose official duties require the preparation and prosecution of applications for patent and who fulfills the requirements of... [Part 10 of 37 CFR] may be registered to practice before the Office to the extent necessary to carry out his or her official duties." If a person is an officier or employee of the United States who is not disqualified for registration under 37 C.F.R. §10.6(d) when that person applies to take the examination, that person's application for registration *must* be accompanied by his or her supervisor's *verified statement* that his or her official duties as a United States officer or employee require him or her to prepare and prosecute applications for patent. If, after applying, a person becomes an officer or employee of the United States, and is not disqualified for registration under 37 C.F.R. §10.6(d), that person must submit the same verified statement from his or her supervisor, preferably promptly upon his or her employment.

If a person who is an officer or employee of the United States is disqualified from registration under 37 C.F.R. §10.6(d) at the time he or she applies for admission to the examination, or becomes so disqualified after applying, but before he or she is registered, registration of such person will be subject to the following conditions:

1. If the person is serving in the patent examining corps of the Patent and Trademark Office (PTO) or as a law clerk or technical advisor in the Court of Appeals for the Federal Circuit (CAFC) and passes the examination, that person will not be registered so long as he or she remains employed by the PTO or CAFC. However, if within one (1) year from the date of termination of employment with the PTO or CAFC, that person's status changes and he or she is no longer disqualified under 37 CFR §10.6(d), that person will be considered eligible for registration upon satisfactory proof of his or her change in status. If that person has not become registered within one (1) year from the date of termination of employment with the PTO or CAFC, that person may not become registered thereafter except upon taking and passing another regularly scheduled examination unless such person has served more than four years in the examining corps of the PTO.
2. If the person passes the examination and is employed by the U.S. Government in an agency or branch other than the PTO or CAFC, that person will not be registered so long as he or she remains disqualified for registration under 37 CFR §10.6(d). However, if within one (1) year from the date notification of passing the examination is mailed, that person's status changes and he or she is no longer disqualified under 37 CFR §10.6(d), that person will be considered eligible for registration upon satisfactory proof of his or her change in status. If a person has not become registered within one (1) year from the date notification of passing the examination is mailed, that person may not become registered thereafter except upon taking and passing another regularly scheduled examination.

Under 37 CFR §10.7(b), persons seeking registration must submit "satisfactory proof of good moral character and repute and of sufficient basic training in scientific and technical matters...." The initial submissions of many persons not having degrees in physics, chemistry and engineering are inadequate, and often they must be supplemented before such persons are approved to take the examination. To afford adequate time to present a satisfactory supplemental showing, it is recommended that persons file their applications early, preferably *at least two months* before the July 31, 1986 deadline. All supplemental showings of qualifications and all application received after July 31, 1986 will be considered only in connection with their admission to the next succeeding examination.

The examination will be given under the supervision of the Office of Personnel Management and may be taken at specific locations in which the Office of Personnel Management conducts examinations.

Application blanks may be obtained from the Office of Enrollment and Discipline, Suite 810, Crystal Park 1, 2011 Crystal Dr., Arlington, Va. or by mail addressed to the Commissioner of Patents and Trademarks, Washington, D.C. 20231, and directed to the attention of the Office of Enrollment and Discipline.

Apr. 21, 1986.

CAMERON WEIFFENBACH,
Director, Office of
Enrollment and Discipline.

PATENT NOTICES

Certificates of Correction for the Week of May 20, 1986

D. 273,704	4,526,147	4,553,941	4,563,151
D. 281,884	4,526,291	4,554,473	4,563,371
D. 283,388	4,528,920	4,554,832	4,563,906
D. 283,389	4,528,957	4,555,543	4,564,310
3,973,618	4,529,775	4,555,768	4,564,595
4,228,038	4,533,765	4,556,103	4,564,638
4,355,005	4,535,173	4,556,370	4,564,813
4,434,231	4,535,542	4,556,587	4,565,341
4,458,104	4,535,948	4,556,722	4,565,469
4,458,318	4,540,106	4,556,753	4,565,709
4,462,071	4,545,367	4,557,119	4,565,780
4,464,228	4,545,490	4,557,762	4,565,794
4,466,988	4,545,962	4,558,689	4,566,164
4,469,825	4,546,779	4,558,713	4,566,560
4,478,897	4,546,845	4,558,863	4,567,133
4,496,459	4,546,848	4,559,686	4,567,173
4,500,707	4,547,086	4,560,015	4,567,176
4,502,082	4,547,513	4,560,168	4,567,224
4,507,148	4,547,589	4,560,399	4,567,302
4,510,839	4,547,857	4,560,508	4,567,545
4,514,658	4,549,339	4,561,219	4,568,770
4,516,184	4,549,448	4,561,319	4,569,014
4,516,580	4,550,390	4,561,429	4,569,091
4,517,588	4,550,792	4,561,723	4,569,448
4,518,428	4,551,461	4,561,746	4,570,456
4,518,597	4,551,882	4,561,762	4,571,253
4,519,937	4,552,118	4,561,837	4,571,432
4,520,151	4,552,211	4,561,846	4,572,046
4,522,009	4,552,330	4,562,343	4,572,250
4,524,134	4,552,498	4,562,389	4,572,517
4,524,521	4,553,343	4,562,487	4,572,754
4,524,690	4,553,400	4,562,941	4,572,854
4,525,316	4,553,836	4,563,110	4,574,652

Reference Collections of U.S. Patents Available for Public Use in Patent Depository Libraries

The following libraries, designated as Patent Depository Libraries, receive current issues of U.S. Patents and maintain collections of earlier issued patents. The scope of these collections varies from library to library, ranging from patents of only recent years to all or most of the patents issued since 1790.

These patent collections are open to public use and each of the Patent Depository Libraries, in addition, offers the publications of the U.S. Patent Classification System (e.g. The Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions, etc.) and provides technical staff assistance in their use to aid the public in gaining effective access to information contained in patents. With one exception, as noted in the table following, the collections are organized in patent number sequence.

Facilities for making paper copies from either microfilm in reader-printers or from the bound volumes in paper-to-paper copies are generally provided for a fee.

Owing to variations in the scope of patent collections among the Patent Depository Libraries and in their hours of service to the public, anyone contemplating use of the patents at a particular library is advised to contact that library, in advance, about its collection and hours, so as to avert possible inconvenience.

State	*Name of Library*	*Telephone Contact*
Alabama	Auburn University Libraries	(205) 826-4500 Ext.21
	Birmingham Public Library	(205) 226-3680
Alaska	Anchorage Municipal Libraries	(907) 264-4481
Arizona	Tempe: Science Library, Arizona State University	(602) 965-7607
Arkansas	Little Rock: Arkansas State Library	(501) 371-2090
California	Los Angeles Public Library	(213) 612-3273
	Sacramento: California State Library	(916) 322-4572
	San Diego Public Library	(619) 236-5813
	Sunnyvale: Patent Information Clearinghouse*	(408) 730-7290
Colorado	Denver Public Library	(303) 571-2122
Delaware	Newark: University of Delaware Library	(302) 451-2238
Florida	Fort Lauderdale: Broward County Main Library	(305) 357-7444
	Miami–Dade Public Library	(305) 375-2665
Georgia	Atlanta: Price Gilbert Memorial Library, Georgia Institute of Technology	(404) 894-4508
Idaho	Moscow: University of Idaho Library	(208) 885-6235
Illinois	Chicago Public Library	(312) 269-2865
	Springfield: Illinois State Library	(217) 782-5430
Indiana	Indianapolis–Marion County Public Library	(317) 269-1706
Louisiana	Baton Rouge: Troy H. Middleton Library, Louisiana State University	(504) 388-2570
Maryland	College Park: Engineering and Physical Sciences Library, University of Maryland	(301) 454-3037
Massachusetts	Amherst: Physical Sciences Library, University of Massachusetts	(413) 545-1370
	Boston Public Library	(617) 536-5400 Ext. 265
Michigan	Ann Arbor: Engineering Transportation Library, University of Michigan	(313) 764-7494
	Detroit Public Library	(313) 833-1450
Minnesota	Minneapolis Public Library & Information Center	(612) 372-6570
Missouri	Kansas City: Linda Hall Library	(816) 363-4600
	St. Louis Public Library	(314) 241-2288 Ext. 390
Montana	Butte: Montana College of Mineral Science and Technology Library	(406) 496-4283
Nebraska	Lincoln: University of Nebraska-Lincoln, Engineering Library	(402) 472-3411
Nevada	Reno: University of Nevada Library	(702) 784-6579
New Hampshire	Durham: University of New Hampshire Library	(603) 862-1777
New Jersey	Newark Public Library	(201) 733-7815
New Mexico	Albuquerque: University of New Mexico Library	(505) 277-5441
New York	Albany: New York State Library	(518) 474-5125
	Buffalo and Erie County Public Library	(716) 856-7525 Ext. 267
	New York Public Library (The Research Libraries)	(212) 714-8529
North Carolina	Raleigh: D. H. Hill Library, N.C. State University	(919) 737-3280
Ohio	Cincinnati & Hamilton County, Public Library of	(513) 369-6936
	Cleveland Public Library	(216) 623-2870
	Columbus: Ohio State University Libraries	(614) 422-6286
	Toledo/Lucas County Public Library	(419) 255-7055 Ext. 212
Oklahoma	Stillwater: Oklahoma State University Library	(405) 624-6546
Oregon	Salem: Oregon State Library	(503) 378-4239
Pennsylvania	Cambridge Springs: Alliance College Library	(814) 398-2098
	Philadelphia: Franklin Institute Library	(215) 448-1227
	Pittsburgh: Carnegie Library of Pittsburgh	(412) 622-3138
	University Park: Pattee Library, Pennsylvania State University	(814) 865-4861
Rhode Island	Providence Public Library	(401) 521-8726
South Carolina	Charleston: Medical University of South Carolina Library	(803) 792-2372
Tennessee	Memphis & Shelby County Public Library and Information Center	(901) 725-8876
	Nashville: Vanderbilt University Library	(615) 322-2775
Texas	Austin: McKinney Engineering Library, University of Texas	(512) 471-1610
	College Station: Sterling C. Evans Library, Texas A & M University	(409) 845-2551
	Dallas Public Library	(214) 749-4176
	Houston: The Fondren Library, Rice University	(713) 527-8101 Ext. 2587
Utah	Salt Lake City: Marriott Library, University of Utah	(801) 581-8394
Virginia	Richmond: Virginia Commonwealth University Library	(804) 257-1104
Washington	Seattle: Engineering Library, University of Washington	(206) 543-0740
Wisconsin	Madison: Kurt F. Wendt Engineering Library, University of Wisconsin	(608) 262-6845
	Milwaukee Public Library	(414) 278-3247

All of the above-listed libraries offer CASSIS (Classification And Search Support Information System), which provides direct, on-line access to Patent and Trademark Office data.

*Collection organized by subject matter.

PATENT EXAMINING CORPS

RENE D. TEGTMEYER, Assistant Commissioner

JAMES E. DENNY, Deputy Assistant Commissioner

CONDITION OF PATENT APPLICATIONS AS OF April 12, 1986

PATENT EXAMINING GROUPS	Actual Filing Date of Oldest New Case Awaiting Action
CHEMICAL EXAMINING GROUPS	
GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director	4-01-85
ORGANIC CHEMISTRY AND BIOTECHNOLOGY, GROUP 120—C. E. VAN HORN, Director	2-15-84
SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP 130—R. F. WHITE, Director	12-18-84
HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director	7-23-84
ELECTRICAL EXAMINING GROUPS	
INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—G. GOLDBERG, Director	3-02-84
SPECIAL LAWS ADMINISTRATION, GROUP 220—K. L. CAGE, Director	1-23-84
INFORMATION PROCESSING, STORAGE, AND RETRIEVAL, GROUP 230—E. LEVY, Director	11-21-83
PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—E. E. KUBASIEWICZ, Director	1-22-85
ELECTRONIC AND OPTICAL SYSTEMS AND DEVICES, GROUP 250—S. S. MATTHEWS, Director	3-28-83
COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP 260—S. G. KUNIN, Director	8-30-83
DESIGN, GROUP 290—K. L. CAGE, Director	1-03-84
MECHANICAL EXAMINING GROUPS	
HANDLING AND TRANSPORTING MEDIA, GROUP 310—B. R. GRAY, Director	7-12-83
MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—S. N. ZAHARNA, Director	12-24-84
MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—R. E. AEGERTER, Director	8-18-83
SOLAR, HEAT, POWER, AND FLUID ENGINEERING DEVICES, GROUP 340—D. J. STOCKING, Director	4-25-84
GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350—A. L. SMITH, Director	7-01-85

Expiration of patents: The patents within the range of numbers indicated below expire during April 1986, except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,435,460 to 3,441,959, inclusive

Plant Patents ..... Numbers 2,876 to 2,881 inclusive

REEXAMINATIONS

MAY 20, 1986

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

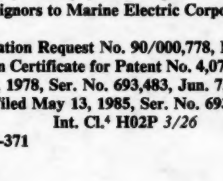
B1 3,850,798 (507th)
METHOD FOR SEPARATING A POLYPEPTIDE FROM MICROORGANISMS
John A. Sjöquist, Hassjevagen 12, Uppsala, Sweden
Reexamination Request No. 90/000,549, May 2, 1984.
Reexamination Certificate for Patent No. 3,850,798, issued Nov. 26, 1974, Ser. No. 409,561, Oct. 25, 1973.
Claims priority, application Sweden, Nov. 6, 1972, 14329/72; Feb. 8, 1973, 7301778
Int. Cl.[4] C07K *3/18, 3/20, 3/28;* **B01D** *15/08*
U.S. Cl. 260—112 R

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 1–7 is confirmed.

1. A method for separating a polypeptide from microorganisms, said polypeptide having the ability of binding at least one immunoglobulin at the Fc-part of the latter, from a liquid containing the polypeptide in a mixture with substances of an impurifying nature, characterized in that the liquid containing said polypeptide is contacted with a solid phase consisting of or containing a polymeric substance which is insoluble in said liquid and which has at least one immunoglobulin or its Fc-fragment bound thereto, the Fc-part of said immunoglobulin or the Fc-fragment thereof being able to bind the polypeptide so that said polypeptide is bound to the Fc-part of the immunoglobulin or to the Fc-fragment thereof but not the substances of the impurifying character, whereupon the liquid with remaining impurities is separated from the solid phase and bound polypeptide is optionally also separated from said solid phase.

B1 4,074,176 (508th)
MOTOR PROTECTOR
Harry G. Parke, Brooklyn, and Harry W. Tomsky, Bronx, both of N.Y., assignors to Marine Electric Corporation, Brooklyn, N.Y.
Reexamination Request No. 90/000,778, May 13, 1985.
Reexamination Certificate for Patent No. 4,074,176, issued Feb. 14, 1978, Ser. No. 693,483, Jun. 7, 1976.
Filed May 13, 1985, Ser. No. 693,483
Int. Cl.[4] H02P *3/26*
U.S. Cl. 318—371



AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 17–27 is confirmed.

Claims 1, 2, 4, 5, 7, 9–11, 13, 14 and 16 are determined to be patentable as amended.

Claims 3, 6, 8, 12 and 15, dependent on an amended claim, are determined to be patentable.

New claims 28–31 are added and determined to be patentable.

1. *In combination with an electric motor having a primary dynamic braking voltage controller for preventing excessive dynamic brake voltage during dynamic braking, the improvement comprising:*

[Apparatus] *an apparatus* for preventing damage to [an] *the* electric motor during dynamic braking comprising:

sensing means, *functionally independent of said primary voltage controller* for electrically detecting *the* dynamic brake voltage of the electric motor;

means responsive to said detected dynamic brake voltage for generating an output whenever said voltage exceeds a predetermined value; and

means responsive to the output of said voltage responsive means for interrupting dynamic braking and substituting mechanical braking therefor whereby damage to the motor [by] *from* excessive dynamic braking voltages may be prevented *when said primary voltage controller fails to limit the dynamic brake voltage to said predetermined level.*

B1 4,335,570 (509th)
HARVESTING SHAKER FOR CROPS SUCH AS TOMATOES OR THE LIKE
Richard W. Fitzmaurice, Santa Clara, Calif., assignor to FMC Corporation, Chicago, Ill.
Reexamination Request No. 90/000,684, Dec. 10, 1984.
Reexamination Certificate for Patent No. 4,335,570, issued Jun. 22, 1982, Ser. No. 182,259, Aug. 28, 1980.
Int. Cl.[4] A01D *45/00*
U.S. Cl. 56—327 R

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims 15 and 16 is confirmed.

Claims 4, 6 and 7 are cancelled.

Claims 1–3 and 8 are determined to be patentable as amended.

Claims 5 and 9–14, dependent on an amended claim, are determined to be patentable.

New claims 17–20 are added and determined to be patentable.

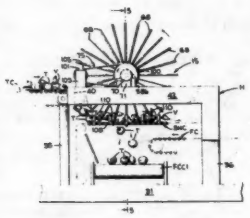
1. In a harvester for vine crops, such as tomatoes, wherein

the vines are severed near ground level, removed from the ground, and moved to a position within the harvester framework, an improved means for disengaging fruit from the vine, comprising:

a shaker head having a plurality of radically projecting tines;

means for mountng the shaker head on the harvester framework for rotation about a substantially horizontal axis;

means for inducing a rotative oscillation in the shaker head; and



[a] *driven* support conveyor [assembly] *means* mounted on the harvester [in fixed position relative to the] framework and adjacent to said shaker head [and operating to support] *for moving the severed vines past the shaker head and for supporting* the severed vines in *a* position *thereon* so that the tines on the shaker head penetrate the vines and induce a shaking action [therealong] *in the vine mass* which disengages the fruit from the vines.

B1 4,456,527 (510th)

HYDROCARBON CONVERSION PROCESS

Waldeen C. Buss, Kensington; Leslie A. Field, Oakland, and Richard C. Robinson, San Rafael, all of Calif., assignors to Chevron Research Company, San Francisco, Calif.

Reexamination Request No. 90/000,762, Apr. 19, 1985.

Reexamination Certificate for Patent No. 4,456,527, issued Jun. 26, 1984, Ser. No. 477,111, Mar. 21, 1983.

Continuation-in-part of Ser. No. 436,498, Oct. 20, 1982, abandoned.

Int. Cl.[4] C10G *45/00*

U.S. Cl. 208—89

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

The patentability of claims **1–13** is confirmed.

Claim **14** is cancelled.

1. A hydrocarbon conversion process comprising reforming a hydrocarbon feed having a sulfur concentration of below 100 ppb over a catalyst comprising a large-pore zeolite containing at least one Group VIII metal to produce aromatics and hydrogen.

3. A hydrocarbon conversion process comprising:

(a) subjecting a hydrocarbon feed to hydrotreating:

(b) passing said hydrotreated hydrocarbon feed through a sulfur removal system to reduce the sulfur concentration of said hydrotreated hydrocarbon feed to below 100 ppb; and

(c) reforming said hydrotreated hydrocarbon feed having a sulfur concentration of below 100 ppb over a dehydrocyclization catalyst comprising a type L zeolite containing at least one Group VIII metal to produce aromatics and hydrogen.

REISSUES

MAY 20, 1986

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

Re. 32,149

PHOTOGRAPHIC ELEMENTS CONTAINING DIRECT-POSITIVE EMULSIONS AND PROCESSES FOR THEIR USE

Robert A. Silverman, Rochester, and Harry A. Hoyen, Webster, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Original No. 4,444,874, dated Apr. 24, 1984, Ser. No. 418,313, Sep. 15, 1982. Application for reissue Jul. 2, 1984, Ser. No. 627,017

Int. Cl.[4] G03C *5/24*

U.S. Cl. 430—409 **22 Claims**

1. A photographic element particularly adapted to forming a direct-positive image comprised of

a support and, located on said support,

a first, radiation-sensitive emulsion layer containing core shell silver halide grain population having a coefficient of variation of less than 20%, and

a second silver halide emulsion layer substantially incapable of forming a surface latent image within the direct-positive exposure latitude of the first emulsion layer and containing a second grain population capable of internally *forming a latent image by internally* trapping photolytically generated electrons,

said second grain population having an average diameter less than 70% that of said first grain population, and

said first and second silver halide grain populations being present in a weight ratio of from 5:1 to 1:5.

Re. 32,150

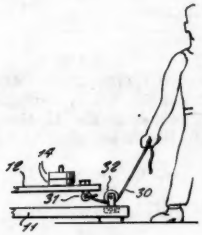
WEIGHTED ROTATABLE THERAPEUTIC EXERCISE DEVICE

Max Rice, 1501 17th Ave., Apt. 712, Seattle, Wash. 98122

Original No. 4,385,761, dated May 31, 1983, Ser. No. 235,945, Feb. 19, 1981. Application for reissue May 23, 1984, Ser. No. 613,802

Int. Cl.[4] A63B *21/00*

U.S. Cl. 272—128 **5 Claims**



2. A therapeutic exercise device, comprising, in combination, a stationary base, a horizontally disposed, rotatable turntable mounted on said base and having a single degree of freedom about a vertical axis, stationary stanchion means spaced from the turntable at the side of the base and supporting handle means to be gripped by a person while performing various twisting exercises on the turntable, and support means mounted on and extending upwardly from the center of the turntable and being in substantial alignment of the vertical axis thereof and adapted to support the torso of the person while exercising on the turntable.

Re. 32,151

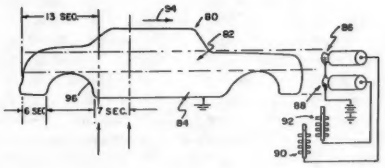
VARIABLE LOW-PRESSURE FLUID COLOR CHANGE CYCLE

James A. Scharfenberger, Indianapolis, Ind., assignor to Ransburg Corporation, Indianapolis, Ind.

Original No. 4,348,425, dated Sep. 7, 1982, Ser. No. 275,872, Jun. 22, 1981. Continuation-in-part of Ser. No. 228,166, Jan. 26, 1981, Pat. No. 4,311,724. Application for reissue Mar. 28, 1983, Ser. No. 479,485

Int. Cl.[4] B05D *7/14, 1/00*

U.S. Cl. 427—8 **12 Claims**



1. A process for terminating the flow of a coating material in a coating material delivery tube which delivers the coating material to a dispensing device from which the material is dispensed during a coating operation and from which flow of the material ceases at the end of the coating operation including the steps of terminating the flow of coating material to the delivery tube before the end of the coating operation, [and] initiating the flow of a liquid medium at low superatmospheric pressure to the delivery tube to ensure continued delivery of coating material from the delivery tube to the dispensing device during the interval between shut-off of coating material flow to the delivery tube and the end of the coating operation *and adjusting the low superatmospheric pressure to maintain the rate of delivery of the coating material from the delivery tube to the dispensing device substantially constant as the volume of the remaining coating material in the delivery tube decreases and to account for variations in coating material characteristics and to promote relatively constant delivery of coating materials having different characteristics.*

Re. 32,152

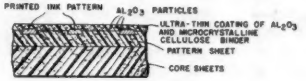
ABRASION RESISTANT LAMINATE

Herbert I. Scher, and Israel S. Ungar, both of Randallstown, Md., assignors to Nevamar Corporation, Odenton, Md.

Original No. 4,305,987, dated Dec. 15, 1981, Ser. No. 136,220, Apr. 1, 1980. Division of Ser. No. 879,848, Feb. 22, 1978, Pat. No. 4,255,480, which is a continuation-in-part of Ser. No. 758,265, Jan. 10, 1977, abandoned. Application for reissue Nov. 4, 1983, Ser. No. 548,905

Int. Cl.[4] B32D *3/00*

U.S. Cl. 428—148 **20 Claims**



1. An abrasion resistant decorative laminate meeting NEMA abrasion resistance standards and also capable of withstanding 175–200 cycles of initial wear in the same test comprising:

a backing layer and laminated thereto a thermoset laminating resin impregnated decorative facing sheet, said deco-

rative facing sheet having a print design thereon and an ultra-thin abrasion resistant coating over said print design, said ultra-thin abrasion resistant coating having a thickness of up to about 0.3 mils comprising a mixtr of (1) an abrasion resistant hard mineral particle size 20–50 microns in high concentration sufficient to provide for abrasion resistance without interfering with visibility and (2) stabilizing binder material for said mineral, said thermoset resin being impregnated throughout said print sheet and said coating, said binder material not interfering with visibility, and with said ultra-thin abrasion resistant coating forming the uppermost layer of said laminate.

11. An abrasion resistant decoration laminate having superior NEMA abrasion resistance, superior initial wear resistance in the same test, and superior wear resistance in the Sliding Can Test comprising:

a backing layer and laminated thereto a thermoset laminating resin impregnated decorative facing sheet, said decorative facing sheet having an ultra-thin abrasion resistant coating thereover, said ultra-thin abrasion resistant coating having a thickness of up to about 0.3 mils comprising a mixture of (1) an abrasion resistant hard mineral of fine particle size sufficiently great such that said decretive laminate meets NEMA abrasion resistance standards and withstands 175–200 cycles of initial wear in the same test, in high concentration sufficient to provide for abrasion resistance without interfering with visibility, and (2) stabilizing binder material for said mineral, said thermoset resin being impregnated throughout said decorative sheet and said coating, said binder material not interfering with visibility, and with said ultra-thin abrasion resistant coating forming the uppermost layer of said laminate.

Re. 32,153

HIGHLY THERMOSTABLE GLUCOAMYLASEAND PROCESS FOR ITS PRODUCTION

Masaki Tamura, Kamakura; Mizuho Shimizu, Hino, and Minoru Tago, Tokyo, all of Japan, assignors to CPC International Inc., Englewood Cliffs, N.J.

Original No. 4,247,637, dated Jan. 27, 1981, Ser. No. 55,723, Jul. 9, 1979. Application for reissue Aug. 2, 1985, Ser. No. 761,930

Claims priority, application Japan, Sep. 1, 1978, 53-106354

Int. Cl.[4] C12P *19/20*; C12N *9/34, 1/645*

U.S. Cl. 435—96 **8 Claims**

1. A process for producing a glucoamylase enzyme preparation which comprises culturing cells of a strain of Talaromyces [duponti] *leycettanus* in a nutrient medium and isolating the glucoamylase enzyme preparation from the culture medium.

Re. 32,154

PRODUCTION OF 2-(O-ALKYLTHIOPHENYL)-1,3-(DIAZOCYCLOALKENE HYDROHALIDES)

Helmut Hagen, Frankenthal; August Amann, Ludwigshafen, and Hubert Giertz, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

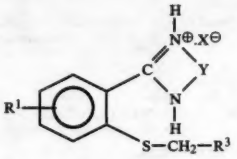
Original No. 4,122,263, dated Oct. 24, 1978, Ser. No. 807,673, Jun. 17, 1977. Continuation-in-part of Ser. No. 349,915, Apr. 11, 1973, abandoned. Application for reissue Feb. 25, 1981, Ser. No. 237,961

Claims priority, application Fed. Rep. of Germany, Apr. 22, 1972, 2219841

Int. Cl.[4] C07D *239/26*

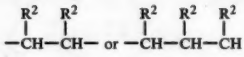
U.S. Cl. 544—114 **7 Claims**

1. A process for the production of a 2-(o-alkylthiophenyl)-1,3-diazacycloalkene hydrohalide of the formula

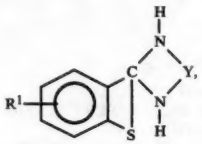


(I)

in which R^1 is hydrogen, bromo, iodo, chloro or alkyl of one to seven carbon atoms, Y is the divalent radical



wherein each R^2 is hydrogen or alkyl of one to four carbon atoms, R^3 is hydrogen, alkyl of one to seven carbon atoms, alkenyl or alkynyl of two to seven carbon atoms each, cyclohexyl, aralkyl of seven to twelve carbon atoms, phenyl or a heterocyclic member selected from the group consisting of pyrryl-(2); imidazolyl-(2); pyridinyl-(2); morpholinyl-(2); oxazolyl-(5); furfuryl-(2); piperazinyl-(2); pyrimidinyl-(6); 1,2,3-oxadiazolyl-(4) or -(5), 1,2,4-oxadiazolyl-(3) or -(5), or 1,2,5-oxadiazolyl-(3) or -(4), and the same oxadiazolyl rings substituted once by methyl, ethyl, phenyl or pyridyl; with the proviso that phenyl may further bear an inert substituent selected from the group consisting of alkyl of 1 to 4 carbon atoms, alkoxy of 1 to 4 carbon atoms, chloro or bromo, and X is bromo, iodo or chloro, which comprises: reacting a benzothietane-2-spiro-2'-(1',3'-diazacycloalkane) of the formula



(II)

in which R^1 and Y have the meanings given above, with an alkyl halide of the formula:

(III)

in which R^3 and X have the meanings given above, at a temperature of from 10° to 150° C.

Re. 32,155

HIGH-EFFICIENCY TUNED INVERTER CIRCUIT

Ole K. Nilssen, Caesar Dr., R.R.-5, Barrington, Ill. 60010

Original No. 4,257,088, dated Mar. 17, 1981, Ser. No. 33,335, Apr. 25, 1979. Application for reissue Mar. 14, 1983, Ser. No. 475,134

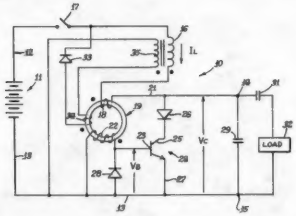
Int. Cl.[4] H02M *3/335*

U.S. Cl. 363—18 **15 Claims**

15. An inverter circuit adapted to provide an AC output voltage and comprising:

semiconductor switching means connected with a source of DC voltage as well as with a tank circuit means, said switching means having control terminals and output terminals, said control terminals being provided with a signal operative periodically and alternatingly to render said switching means in an ON-state and in an OFF-state, said ON-state being characterized by an ON-time during which the switching means exhibits a relatively low resistance to the flow of electric current, said OFF-state being characterized by an OFF-time during which said switching means exhibits a relatively high resistance to the flow of electric current, said tank circuit means: (i) having an inductor and a capacitor operable to

resonantly interact, (ii) having a natural resonance frequency, (iii) being operative to cause the AC output voltage to be, at least in part, sinusoidal in waveshape, independent of frequency, and (iv) being connected with said output terminals; and



saturable reactor means connected in circuit between said output terminals and said control terminals and operative: (i) to provide said signal, and (ii) by way of its saturation characteristics, to determine the duration of said ON-time.

Re. 32,156

METHOD AND APPARATUS FOR CONTROLLING AN INTERNAL COMBUSTION ENGINE, PARTICULARLY THE STARTING UP OF THE ENGINE

Hiroastu Tokuda, Katsuta, and Toshio Furuhashi, Mito, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Original No. 4,274,141, dated Jun. 16, 1981, Ser. No. 952,532, Oct. 18, 1978. Application for reissue Jun. 16, 1983, Ser. No. 505,364

Claims priority, application Japan, Oct. 19, 1977, 52-125979

Int. Cl.[4] F02D *41/24*; F02P *5/04*; G05B *15/02*

U.S. Cl. 364—431.06 **76 Claims**

69. In a microprocessor-controlled apparatus for controlling the operation of an internal combustion engine comprising means for detecting the operating conditions of said engine;

a control apparatus comprising:

means for controlling the operating conditions of said engine;

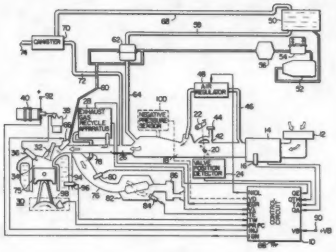
a reference register group consisting of reference registers for respectively holding desired values delivered from said microprocessor;

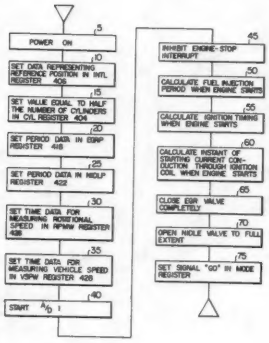
at least one counter for counting up stage signals produced at a predetermined time interval;

a selecting means for selecting one of said desired values in said reference registers;

means for comparing successively the selected one of said desired values in said reference registers with the value of the count held in said counter;

means for supplying the results of the comparison as control signals to said means for controlling said operating conditions of said engine; and




POWER ON
SET DATA REPRESENTING REFERENCE POSITION IN INTL REGISTER 406
SET VALUE EQUAL TO HALF THE NUMBER OF CYLINDERS IN CYL REGISTER 404
SET PERIOD DATA IN EGRP REGISTER 418
SET PERIOD DATA IN MIDLP REGISTER 422
SET TIME DATA FOR MEASURING ROTATIONAL SPEED IN RPMW REGISTER 426
SET TIME DATA FOR MEASURING VEHICLE SPEED IN VSPW REGISTER 428
START
INHIBIT ENGINE-STOP INTERRUPT
CALCULATE FUEL INJECTION PERIOD WHEN ENGINE STARTS
CALCULATE IGNITION TIMING WHEN ENGINE STARTS
CALCULATE INSTANT OF STARTING CURRENT CONDUCTION THROUGH IGNITION COIL WHEN ENGINE STARTS
CLOSE EGR VALVE COMPLETELY
OPEN IADLE VALVE TO FULL EXTENT
SET SIGNAL "GO" IN MODE REGISTER

a mode register coupled to said control apparatus and to said microprocessor for controlling the application of said control signals of said supplying means to said means for controlling said operating conditions of said engine in accordance with data delivered to said mode register from said microprocessor.

PATENTS

GRANTED MAY 20, 1986

ERRATA

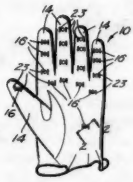
For CLASS	See PATENT NO.
123–479	4,589,401
221–198	4,589,575
220–005	4,589,643
285–319	4,589,684
092–028	4,589,896
522–085	4,589,964
530–394	4,590,001
530–386	4,590,002
530–330	4,590,003
530–317	4,590,004
558–264	4,590,008
560–332	4,590,009
558–341	4,590,010
558–323	4,590,011
558–332	4,590,012
558–332	4,590,013
558–073	4,590,017
544–058	4,590,074

PATENTS

GRANTED MAY 20, 1986

GENERAL AND MECHANICAL

4,589,146
GLOVE HAVING SECURING MEANS FOR IMPROVED GRIPPING
Clarence R. Taylor, 28 Woodside Dr., Penfield, N.Y. 14526
Filed Nov. 5, 1984, Ser. No. 668,010
Int. Cl.[4] A41D *19/00*
U.S. Cl. 2—161 A **8 Claims**



1. A glove for gripping the handle of a golf club or the like comprising:

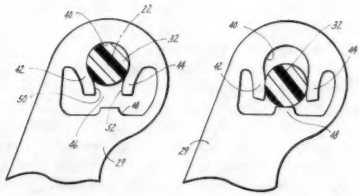
a flexible fabric portion covering the palm side of a hand, said fabric portion having an inner surface facing the hand, an outer surface, and an opening extending through said fabric portion from said inner surface to said outer surface; and

gripping means on said fabric portion comprising hard plastic or metal tack-like members, each tack-like member having a substantially flat head engageable with said inner surface and an integral projection extending from said flat head through said opening in said fabric portion and outwardly past said outer surface a distance of about 35 mils, said projection having a slightly rounded point having a radius of about 5 to 8 mils adapted to dig into the handle of the golf club.

4,589,147
INTRAOCULAR LENS
Herbert J. Nevyas, 1120 Tower La. East, Narberth, Pa. 19072
Filed Mar. 4, 1982, Ser. No. 354,826
Int. Cl.[4] A61F *1/16, 1/24*
U.S. Cl. 623—6 **9 Claims**

1. An intraocular lens for surgical implantation into posterior chamber of the human eye, comprising a lens and two sinuous support strands each having at least one open loop portion, said strands being directly attached to the lens at diametrically opposite locations on the periphery thereof, the radial length of the loops being approximately equal to the diameter of the lens and the width of the loops from side to side being not greater than the diameter of the lens, the loops being linearly compressible along a radius of the lens for a substantial distance toward the center of the lens without substantially increasing the reaction force exerted outward toward the lens optic whereby the lens will automatically align itself with the axis of the lens being substantially coaxial with the axis of the eye regardless of whether the strands are placed in the ciliary sulcus or capsular bag or one strand in each, each of said loops having generally parallel legs which are perpendicular to the longitudinal axis of the lens and which move closer together as the loops are compressed.

4,589,148
TOILET HINGE
John T. Cameron, Howell, Mich., assignor to Thetford Corporation, Ann Arbor, Mich.
Filed Dec. 4, 1984, Ser. No. 678,182
Int. Cl.[4] A47K *13/12*
U.S. Cl. 4—236 **15 Claims**

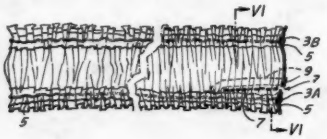


1. In a toilet comprising a bowl with which at least one of a seat and cover is cooperatively associated by hinge means for selective operation between a generally horizontal position overlying the bowl and a second position different from the first-mentioned position, the improvement which comprises said at least one of said seat and cover having a bearing on the bowl at a location spaced horizontally from said hinge means and wherein said hinge means comprises a first hinge part on the bowl and a second hinge part on said at least one of said seat and cover and mean operatively coupling said first and second hinge parts to allow said at least one of said seat and cover to operate between said first-mentioned and said second positions and to resiliently yieldably allow limited vertical bodily displacement of the second hinge part relative to the first hinge part in response to downward loading of said at least one of said seat and cover so as to allow said at least one of said seat and cover to thereby assume a further bearing on the bowl when said at least one of said seat and cover is in the first-mentioned position, in which said means operatively coupling said first and second hinge parts includes a hinge pin between the first and second hinge parts, said means to resiliently yieldably allow limited vertical bodily displacement of the second hinge part relative to the first hinge part comprises a pair of fingers on opposite sides of the hinge pin, at least one of which is resiliently yieldable, integral with one of said hinge parts and having a operative engagement with the hinge pin, said one hinge part having an aperture which has a circular perimeter greater than 180° but less than 360° so as to leave a circumferential opening, said aperture having a diameter slightly greater than the diameter of the hinge pin and the hinge pin being disposed in essentially coaxial engagement with the aperture when said at least one of said seat and cover is not subjected to downward loading, and wherein said fingers extend from the circumferential opening of said aperture to form a throat having a nominal dimension which is less than the diameter of the hinge pin at the engagement thereof with the aperture, the dimension of said throat yieldably expanding in response to downward loading of said at least one of said seat and cover by said hinge pin being urged from said aperture and into engagement with said fingers in response to such downward loading, and said finger coacting on said hinge pin to urge the same back toward said aperture.

4,589,149
HYGIENIC DEVICE FOR COVERING WATER-CLOSET RING-SHAPED SEATS AND THE LIKE

Giuseppe Bassi, 23, Via Caminate, Bibbona, Livorno, Italy

Continuation of Ser. No. 503,502, Jun. 13, 1983, abandoned.
This application Feb. 19, 1985, Ser. No. 702,497
Claims priority, application Italy, Jun. 15, 1982, 17407 A/82
Int. Cl.[4] A47K *13/14*
U.S. Cl. 4—242 2 Claims

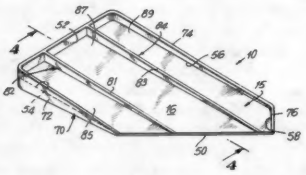


1. A disposable cover for an annular toilet seat having an outer periphery and an inner rim spaced inwardly of the outer periphery and extending around an opening of the seat, consisting essentially of: a cylindrical ring of disposable flexible wrinkled cover material having substantially identical parallel opposite annular edges; an endless elastic band extending along and secured to each opposite edge, each of said bands being of substantially the same length; said edges of said cover and said elastic bands being of a size such that one of said bands is engageable around the outer pheriphery of the toilet seat and the other is stretched over the inner rim of the toilet seat when it is applied thereto; said cover material being a plastified paper having edges which are folded and secured to surround the respective elastic bands and having a line of perforations defining when broken an opening between the edges of said cover for accommodating a toilet part.

4,589,150
REVERSIBLE DRAINBOARD FOR A CORNER SINK INSTALLATION

Augustine Sciabarassi, 8 Laurai La., Levittown, N.Y. 11756

Filed May 16, 1985, Ser. No. 734,551
Int. Cl.[4] A47L *19/02*
U.S. Cl. 4—656 6 Claims



1. A reversible drainboard for a corner sink installation having a pair of rectangular kitchen counters orthagonally connected to one another in the corner of a kitchen and a sink mounted in said counters at the connection thereof at an angle of 45 degrees with respect to the lengthwise sides of said counters, said drainboard comprising:

a planar member having:

a plurality of outer peripheral edges connected end to end to form the outer periphery of said planar member and the length and the width thereof, said outer peripheral edges including an oblique front edge having the length of at least a side of said sink and an angular orientation of 135 degrees with respect to a datum line parallel to said length of said planar member; and

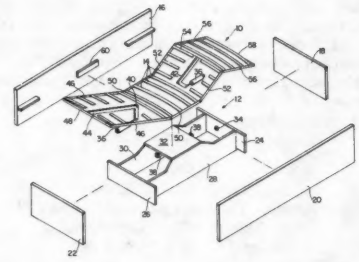
a pair of opposed first and second surfaces defined between the said oblique front edge and the remaining of said peripheral edges, said surfaces being spaced from one another to form the thickness of said planar member; and

a sidewall having a height defined by an upper and a lower surface, said height being greater than the thickness of said planar member, said sidewall connected only to said remaining of the said peripheral edges along the length thereof, from one end of said oblique front edge to the other end thereof, with said planar member located above said lower surface and below said upper surface of said sidewall, whereby said drainboard is operable to be positioned on one of said counters with said oblique front edge in an overlying and parallel relationship with one of the sides of said sink and the said second surface facing the said counter or alternately reversed and positioned on the other of said counters with said oblique front edge in an overlying and parallel relationship with the other of the sides of said sink and with said said first surface facing the said counter; said side wall that are connected to said peripheral edges running along said length of said planar member are tapered towards the said oblique front edge thereof to allow water to drain along said first and second surfaces and from said oblique front edge when said drainboard is in either of its said positions with respect to said sink.

4,589,151
SLATTED BED SYSTEM

Robert S. Behrens, 1855 Elmira Ct., St. Louis, Mo. 63141

Filed Jul. 8, 1983, Ser. No. 512,090
Int. Cl.[4] A61G *7/06;* A47C *23/06*
U.S. Cl. 5—66 8 Claims



1. A slatted bed system comprising:

(a) support means;

(b) an articulating frame carried by said support means, said frame having a head movable portion, a fixed portion, a thigh movable portion and a foot portion, said fixed portion including a pair of side members supported by said support means,

said head portion including two side members and a head end member rigidly secured thereto at one end, each of said side members being pivotably secured at the other end thereof to the adjacent end of one of the side members of said fixed portion,

said thigh portion including two side members and a cross member rigidly secured thereto adjacent the end thereof nearest to said foot portion, said side members being secured at the other end thereof to the adjacent ends of the side members of said fixed portion, said foot portion including two side members and a foot end member rigidly secured thereto at one end, each of said side members being pivotably secured at the other end thereof to the end of one of the side members of said knee portion;

(c) a first L-shaped crank having the longest portion thereof approximately the length of the side members of said head portion,

the longest portion thereof being rigidly secured at the

free end thereof to said head member intermediate the ends thereof, and

the junction of the longer portion and the shorter portion being pivotably secured to said support means with the free end thereof extending downwardly;

(d) a first linear actuator carried at one end by said support means adjacent said head member and pivotably connected at the other end to the free end of the shorter portion of said first L-shaped crank whereby the contracting of said first linear actuator effects a raising of said head member and whereby the extending of said first linear actuator effects a lowering of said head member;

(e) a second L-shaped crank having the longest portion thereof approximating the length of the side member of said knee portion,

the longest portion thereof being rigidly secured at the free end thereof to said cross member intermediate the ends thereof, and

the juncture of the longer portion and the shorter portion being pivotably secured to said support means with the free end thereof extending downwardly;

(f) a second linear actuator carried at one end by said support means adjacent said foot member and pivotably connected at the other end to the free end of the shortest portion of said second L-shaped crank whereby the contracting of said second linear actuator effects a raising of the junction of said thigh portion and said foot portion and whereby the extending of said second linear actuator effects a lowering of the junction of said thigh portion and said foot portion;

(g) a plurality of resilient supports;

(h) a plurality of transverse slats carried at opposite ends by the side members of said head, fixed, thigh and foot portions, each of said slats being concave downwardly and selectively positionable along the length of the bed parallel to said foot, cross and head members;

(i) means for removably securing the ends of said slats to one of said side members through one of said resilient supports; and

(j) a mattress conforming in dimension to said articulating frame and adapted to overlie said slats, said mattress having a transverse groove on the underside thereof overlying each of the junctions of said head portion with said fixed position and said thigh portion with said fixed portion, said grooves extending upwardly over one-half the thickness of the mattress to thereby permit the bending of the mattress as said head portion and or said thigh portion is raised,

said mattress having a transverse groove on the underside thereof overlying the junction of said thigh and foot portions, said groove extending upwardly over one-half the thickness of the mattress and having sufficient width to permit bending of the mattress as the junction of said thigh and foot portions is raised.

4,589,152

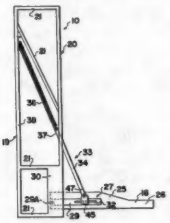
FOLD-AWAY BED ASSEMBLY

Peter Pakosh, Winnipeg, Canada, assignor to Kendon Manufacturing Ltd., Winnipeg, Canada

Filed Sep. 6, 1983, Ser. No. 529,333
Int. Cl.⁴ A47C *13/40*
U.S. Cl. 5—164 R **12 Claims**

1. A fold-away bed assembly comprising in combination a vertical support frame, a bed frame having ends and spaced parallel sides, pivot means arranged adjacent one end of the bed frame so as to couple the bed frame to the vertical support frame at a lower end thereof to provide movement of the bed frame relative to the support frame from a vertical stored position to a horizontal bed position and vice-versa, and tension spring means one upon each side of the bed frame and each operatively extending between said vertical support frame and a respective side of said bed frame, each said tension spring means comprising solely a single tension spring, first coupling means for coupling one end of said spring to said support frame and second coupling means for coupling an opposed end thereof to said respective side of said bed frame at a position thereon adjacent to but spaced from said pivot means and means for adjusting said position of said second coupling means relative to said side in a direction substantially longitudinal to said side.

5. A kit of parts for a fold-away bed assembly of the type comprising a vertical support frame and frame members for forming a bed frame having ends and parallel spaced sides, the kit comprising pivot means arranged for attachment to the bed frame adjacent one end thereof, pivot coupling means for mounting on the vertical support frame adjacent a lower end thereof whereby the bed frame can be moved from a vertical



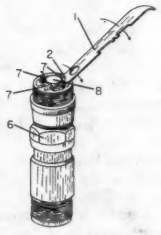
stored position to a horizontal bed position and vice-versa, tension spring means and means for mounting said tension spring means one upon each side of the bed frame so that each extends from the vertical support frame above said pivot means to a respective side of said bed frame, each said tension spring means comprising solely a single tension spring, first coupling means for coupling one end of said spring to said support frame and second coupling means for coupling an opposed end thereof to said respective side of said bed frame at a position thereon adjacent to but spaced from said pivot means and means for adjusting said position of said second coupling means relative to said side in a direction substantially longitudinal to said side.

4,589,153

AIRCRAFT SPARK PLUG GAPPING TOOL

Edward J. Paquette, 2058 S. Mountain Ave., Ontario, Calif. 91761

Filed Apr. 5, 1984, Ser. No. 597,072
Int. Cl.⁴ B25F *1/00*
U.S. Cl. 7—169 **11 Claims**



1. A tool for adjusting the gap between side and center electrodes situated within an electrode cavity at one end of a spark plug, comprising:

an elongated handle body having first and second opposite ends;

a fork tip connected to said first end of said handle consisting of two parallel prongs spaced apart so that the outside edges of each said prong will fit under the bottom surface of adjacent side electrodes and the inside edges define an

aperature between said prongs sufficient to enclose the external diameter of said center electrode and to enclose the width of any said side electrode; and

means of connecting said fork tip at an offset angle to the longitudinal axis of said handle so that said tool may be operated in a first position in which the spark plug gap may be increased by engagement of the bottom surface of two side electrodes with each said prong and levering said electrodes about a fulcrum point of contact between said handle and the bottom side wall edge of said spark plug, said tool being operable in a second position turned over with respect to said first position about said handle longitudinal axis so that the spark plug gap may be decreased by top staddling a side electrode and bending said electrode toward said center electrode by engagement of the inner edge of said fork opening with the outside tip surface of said electrode while levering against the engagement points of the tips of said forks and the inner side wall of said spark plug electrode cavity.

4,589,154

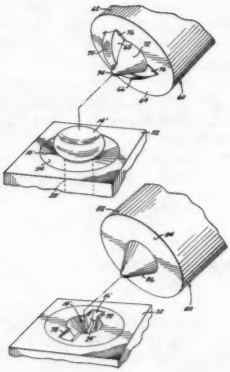
METHOD AND APPARATUS FOR FORMING THE HEAD OF A HIGH TORQUE FASTENER

John Vaughn, P.O. Box 3368, Granada Hills, Calif. 91344

Continuation-in-part of Ser. No. 492,164, May 6, 1983, Pat. No. 4,497,225. This application Oct. 17, 1984, Ser. No. 661,665

Int. Cl.⁴ B23G *9/00*; B21K *1/48*

U.S. Cl. 10—7 **2 Claims**



1. Apparatus for forming the head of a high torque fastener, comprising:

a die for supporting a fastener preform having a shank and a blank head at one end of the shank;

a first forming hammer including a generally cylindrical body having a generally planar face at one end thereof, a blade portion projecting from said planar face having parallel side walls separated by an arcuately convex lower surface, a central conical tip projecting from said planar face and formed centrally on said blade portion with an apex end projecting substantially beyond said lower surface, and relatively shallow channels formed in said planar face alongside said side walls and extending with decreasing depth and width away from said conical tip;

said first forming hammer being for deforming said blank head upon impact therewith to form an intermediate blank head defined by a generally planar head surface interrupted centrally by a diametric slot having generally parallel side walls and an arcuately cocave bottom wall, a central conical recess formed along the diametric slot, and upstanding ridges extending along the upper extents of said slot side walls with a height and width diminishing in a direction away from the conical recess; and

a second forming hammer including a generally cylindrical body having a generally planar face at one end thereof with a central conical tip projecting therefrom with a size and shape generally matching the conical tip on said first forming hammer;

said second forming hammer being for deforming said intermediate blank head upon impact therewith to deform said ridges downwardly relative to said slot side walls to remove said ridges and to alter said side walls to a generally bow-tie shaped, slightly undercut configuration.

4,589,155

METHOD FOR MAKING A NUT FOR A BLIND FASTENER

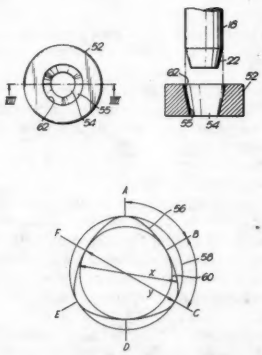
Harvey P. Jeal, Stevenage, England, assignor to Avdel Limited, Hertfordshire, England

Filed Nov. 17, 1982, Ser. No. 442,504

Claims priority, application United Kingdom, Nov. 18, 1981, 8134740

Int. Cl.⁴ B21D *53/24*

U.S. Cl. 10—86 A **2 Claims**



1. A method for forming a nut for a three piece blind fastener having a screw threaded bolt, an expansible sleeve and a tubular nut having an internally screw threaded bore for receiving the bolt in threaded engagement therewith, the bolt comprising a threaded stem having a break off portion at one end connected to the rest of the stem by a breakneck, and a head at the other end of said stem, the nut comprising a shank having an enlarged head at one end and a nose which tapers away from the head at the other end, so that the bolt can be engaged in the bore of the nut so that the break off portion projects from the head of the nut, and the sleeve being interposed on the stem of the bolt between the head of the bolt and the nose of the nut, said method comprising the steps of:

providing a die having an aperture which tapers at an angle smaller than that of the nose of said nut and has a non-circular, non-reentrant cross-sectional shape having a single sense of curvature;

forcing said tapered nose end portion of the shank of the nut into said aperture of said die, and

constricting a zone of the bore of said nut spaced from an end face thereof and imposing a cross-sectional shape corresponding to that of said die aperture on said constricted zone.

4,589,156

SUPPORT STRUCTURE, PARTICULARLY FOR A LONG SPAN BRIDGE

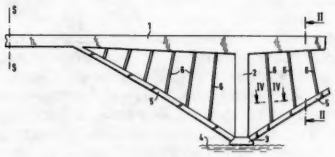
Herbert Schambeck, Frieding/Andechs, Fed. Rep. of Germany, assignor to Dyckerhoff & Widmann Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Jan. 31, 1985, Ser. No. 696,787

Claims priority, application Fed. Rep. of Germany, Jan. 31, 1984, 3403140

Int. Cl.[4] E01D *7/00, 7/02, 19/00*

U.S. Cl. 14—4 14 Claims



1. A support structure, such as for a long span bridge structure, comprising an elongated generally horizontally extending beam-like girder with said girder being formed of reinforced concrete or prestressed concrete and having a pair of spaced ends and being symmetrical about a vertical axis of symmetry between the ends thereof, at least one upright support pier for one end of said girder so that said girder is bending resistant, said support pier having an upper end connected to and supporting said girder and a lower base end, and a strut framework comprising an elongated rectilinear compression strut connected at one end to said girder at a position spaced outwardly from the upper end of said support pier and connected at the other end to said support pier adjacent the lower end thereof so that said compression strut extends diagonally and rectilinearly between said generally horizontal girder and said support pier, said compression strut is formed of reinforced concrete, and elongated tie members each connected at one end to said compression strut at spaced positions between said support pier and said girder and extending upwardly therefrom and connected at the other end to one of said girder or support pier.

4,589,157

APPARATUS FOR THE CONSTRUCTION OF A BRIDGE FLOOR AND SIMILAR STRUCTURES, AND CONSTRUCTIONS WHICH ARE OBTAINED

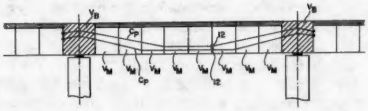
Pierre Richard, Neuilly S. Seine, France, assignor to Bouygues, Clamart, France

Continuation of Ser. No. 460,596, Jan. 24, 1983, abandoned. This application Feb. 5, 1985, Ser. No. 698,267

Claims priority, application France, Jan. 24, 1983, 8201439

Int. Cl.[4] E01D *9/04, 19/12*

U.S. Cl. 14—73 13 Claims



1. A floor of a bridge or a similar structure, which is constructed from sections which are assembled step by step, the floor comprising a series of longitudinally extending mixed steel-concrete sections, each comprising an upper concrete slab and a metal frame of steel integral with and disposed between and supporting the upper concrete slab, said series of mixed sections being arranged in end-to-end abutting relationship, a concrete anchor section at each end of each such series of mixed sections, each concrete section being supported from beneath as by a bridge pier, and a plurality of longitudinally extending prestress cables, the series assembly of the mixed and concrete sections being reinforced by the prestress cables which freely penetrate the metal frames and which are attached at opposite ends to the concrete sections, each mixed section having prefabricated connection pieces lying in a lower substantially horizontal plane, and diagonal frame members extending upwardly therefrom and connecting to and supporting the upper concrete slab, and at least some of the connection pieces having a transverse front plate to be fitted against a similar plate of a corresponding surface of an adjacent mixed section and said connection pieces having holes for the free passage of said prestress cables.

4,589,158

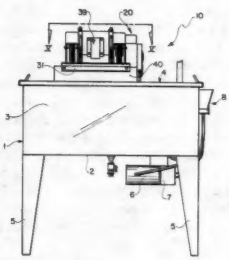
ARTICLE CLEANING DEVICE FOR REMOVING SURFACE CONTAMINANTS FROM THE ARTICLE BY BRUSHING AND LIQUID CONTACT

Morris Sheldon, 158 Hoffman St., Nevada City, Calif. 95959

Filed Sep. 19, 1984, Ser. No. 652,000

Int. Cl.[4] A46B *13/04*

U.S. Cl. 15—21 D 18 Claims



1. An article cleaner for removing surface contaminants from the article comprising in combination:

a basin adapted to receive a cleaning liquid therein;

brush means perched above a lip of said basin;

cleaning liquid conduit and pump means recirculating the cleaning liquid from said basin to a nozzle supported adjacent said brush means for enhanced cleaning;

means for scavenging said recirculating cleaning liquid just below the surface of the cleaning liquid to preclude contaminant recirculation; and

means for orienting said brush means to different angles of attack including a support plate having means thereon to support a motor at a rearward extremity carrying a sheave on an outward shaft thereof, a further sheave forward thereof and connected to said motor sheave by means of a pulley belt, said forward sheave supporting in turn an axle having said brush means positioned thereon being adapted to rotate with said sheave, distal ends of said axle provided with threaded extremities serving as power takeoff, a slotted bracket carried on said basin and extending upwardly therefrom adapted to be adjustably fastened to an ear extending upwardly from an upper surface of said support plate, a pivot on a rear area of said support plate adapted to allow the support plate to articulate thereabout, and means connecting said pivot to an outer surface of a wall of said basin whereby said brush means and said supporting plates can be angulated within the limits and constraints imposed by said slotted bracket.

4,589,159

TOOTHBRUSH

Adolf Streibel, Günderodestr. 6, D-8000 München 83, Fed. Rep. of Germany

Filed Dec. 28, 1983, Ser. No. 566,210

Claims priority, application Fed. Rep. of Germany, Dec. 29, 1982, 3248527

Int. Cl.[4] A46B 9/04

U.S. Cl. 15—167 R **10 Claims**

1. A toothbrush comprising a handle including an end portion and an elongated substantially plane second portion having a pair of longitudinally extending marginal portions; bristles anchored in and extending from said end portion; a substantially disc-shaped indicia-bearing member provided on and generally coplanar with said second portion and extending laterally beyond at least one of said marginal portions; and means for facilitating suspension of the toothbrush in such orientation that said end portion is disposed at the lower end of said handle, including a discrete hook in the region of each of said marginal portions, said hooks defining sockets which are open toward said end portion and each of which can receive a wire- rod- or cord-like support for the toothbrush so that the latter can be suspended without tilting or turning.

4,589,160

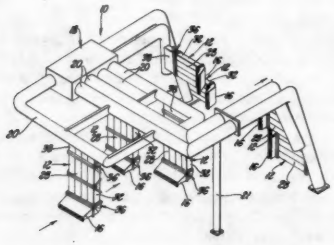
APPARATUS FOR STRIPPING FLUIDS INCLUDING DIMENSIONALLY STABLE AND SUBSTANTIALLY RIGID BAG

David R. Day, P.O. Box 52, Port Aransas, Tex. 78373, and Lucian G. McElroy, 3315 Brocker Rd., Metamora, Mich. 48455

Filed Jun. 11, 1984, Ser. No. 619,316

Int. Cl.[4] F26B 19/00

U.S. Cl. 15—316 R **41 Claims**



1. An apparatus (10) for stripping fluid from the surface of a vehicle (26) as the vehicle (26) is conveyed along a path through a car wash comprising: an air distributor (18); a plurality of dimensionally stable and substantially rigid ducts (12) defining a forward entrance along the vehicle path and a rear exit, said ducts (12) supported from said air distributor (18) in an array along the path of the vehicle (26) to strip fluid from the top and side surfaces of the vehicle (26), each of said ducts (12) including an inlet end (14) for introducing air under pressure into said duct (12) and a nozzle end (16,16') of smaller cross sectional area than said inlet end (14) spaced apart from said inlet end (14) for emitting a stream of air; and flexible joint means connecting said duct (12) to said air distributor (18) for allowing hinging movement of said duct (12) substantially along a single axis from a neutral extending position to a flexed position relative to said air distributor (18) in response to said nozzle end (16,16') following the contour of the surface of the vehicle (26), said ducts (12) being inflexible self supporting from said flexible joint means, each of said ducts (12) being substantially rectangular in cross section, said duct (12) including spaced and substantially parallel forward facing and rear facing panels (28,30) having a first transverse dimension and two spaced side panels (32,34) having a second transverse dimension and interconnecting said forward and rear panels (28,30), said first transverse dimension of said forward and rear panels (28,30) being greater than said second transverse dimension of said side panels (32,34), said assembly (10) further including expansion preventing means for preventing said forward and rear panels (28,30) from being forced apart by the flow of pressurized fluid therebetween to maintain said forward and rear panels (28,30) in spaced parallel relationship.

4,589,161

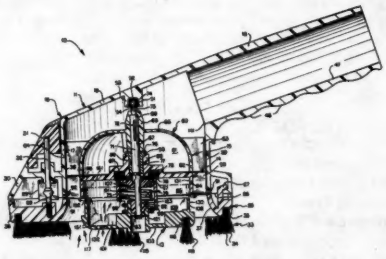
VACUUM DRIVEN TOOL

Werner W. Kochte, Ravenna, and Susan K. Nimon, Cuyahoga Falls, both of Ohio, assignors to The Scott & Fetzer Company, Twinsburg, Ohio

Continuation of Ser. No. 639,956, Aug. 10, 1984, Pat. No. 4,554,702. This application Aug. 8, 1985, Ser. No. 763,813

Int. Cl.[4] A47L 9/04

U.S. Cl. 15—372 **7 Claims**



1. A vacuum rotary sweeper comprising a housing having an air inlet and an air outlet, a rotating unit including a rotary brush supported on a central shaft in the housing adjacent the inlet for rotation about the axis of the shaft, a turbine wheel rotatably supported on the shaft in the housing for rotation about said shaft axis, means rotationally coupling the brush to the turbine wheel, the housing having an interior peripheral surface area encircling a portion of the turbine wheel and forming a portion of an annular flow passage for air passing between the inlet and outlet, a stator disposed about said shaft axis, an end bearing supported on the housing on a side thereof opposite said inlet, said end bearing having an end wall surface for supportinig end thrust and a sidewall surface for supporting radial loads, a bearing in said stator for supporting radial loads, said shaft having a spherical end portion for operation in said end bearing, said spherical end portion allowing said shaft to self-align with said end bearing and permitting said rotating unit carrying said shaft to be readily removed and replaced from and into said housing by movement in a direction generally parallel to the axis of the shaft.

4,589,162

CARRYING HANDLE DEVICE FOR AN ELECTRICAL EQUIPMENT ENCLOSURE WITH HANDLE STORED FLUSH WITH THE ENCLOSURE WALL AND SWUNG UP FOR CARRYING

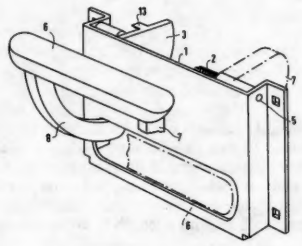
Hermann Manz, Illingen, and Walter Schweiger, Linkenheim, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich and Berlin, Fed. Rep. of Germany

Filed Sep. 19, 1984, Ser. No. 651,981

Claims priority, application Fed. Rep. of Germany, Sep. 19, 1983, 3333826

Int. Cl.[4] B65D *25/28*

U.S. Cl. 16—115 13 Claims



1. A carrying device for an electrical apparatus enclosure having a wall with an opening therein, comprising:

elongate carrying arms bent in a semi-circular shape protruding through the opening in the wall of the enclosure and movably suspended behind the wall;

a carrying handle mounted on the arms and movable between rest and working positions, in the rest position the handle lying flush to the outside in the wall opening and in the working position is swung up, out of the housing, said carrying arms swivel around a fixed axle and have a straight part, the length of which is approximately equal to the distance of axle to the opening in the enclosure, and an arc-shaped section having the length of approximately 1/4 of a circle and having the handle attached to it;

a spring arranged on a swivelling axis which swings the carrying handle into the working position; said carrying arm is fixed on a pin which is parallel to the swivelling axis, the pin engaging a swivelling guide plate, the axis of which is arranged parallel to the swivelling axis of the carrying arm, in the working position of the carrying handle the pin and guide plate are not meshed and the guide plate is pressed against a stop plate by a spring, when the swivelling arms move from the working position of the carrying handle into the rest position the pin lies against the sliding surface of the guide plate and swivels the guide plate back against the pressure of the spring, the end of the sliding surface forming a first nose over which the pin slips after reaching the rest position, releasing the guide plate which is pushed by the spring and swivels against a stop until the pin settles in a fork-like recession of the guide plate.

4,589,163

SELF CLOSING LIFT RING

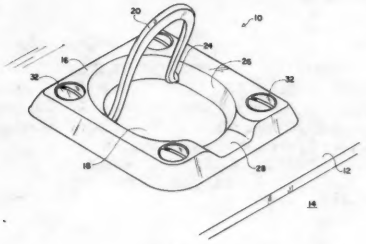
Robert G. Weatherby, Longboat Key, and W. Fred Stein, Sarasota, both of Fla., assignors to James A. Huebner, Sarasota, Fla., a part interest

Filed Feb. 27, 1984, Ser. No. 584,159

Int. Cl.[4] B65D *25/32*

U.S. Cl. 16—124 21 Claims

1. A locking lift ring comprising a base member having a central recess bounded by sidewalls symmetrically placed with respect to the centerline of said base member, a bail pivotally mounted in said base member, and configured to reside entirely within the confines of said central recess when not in use, said base member having a pair of holes located in the sidewalls of said recess, said holes being symmetrically placed with respect to the centerline of said base member, said bail having outwardly extending pintles residing in said pair of holes, so as to form the pivotal support for said bail, at least one of said holes being slightly non-circular and at least the corresponding outwardly turned pintle being bent out of the plane of said bail, latter pintle having an axis bent out of the plane of the bail, and being rotatable in said non-circular hole for only a limited



number of degrees of bail movement, with the relationship of latter pintle and hole effectively preventing said bail from being raised away from said base plate to an orthogonal position, and a tumbler lock disposed in substantially the center of said recess, said lock having a keyhole at one end, and having a cam mounted at its other end, such that the cam can be rotated to engage an adjacent structure when the correct key has been inserted into the keyhole.

4,589,164

VARIABLE TENSION DEVICE WITH ADJUSTABLE FEATURES FOR SPRING RATE, INITIAL TENSION AND CONNECTION TO EXTERNAL PARTS

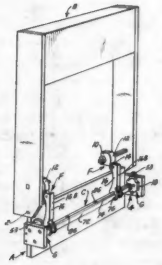
George H. Leonard, Darien, Conn., assignor to Airpot Corporation, Norwalk, Conn.

Filed Jun. 8, 1984, Ser. No. 618,897

The portion of the term of this patent subsequent to Feb. 25, 2003, has been disclaimed.

Int. Cl.[4] E05F *1/08*

U.S. Cl. 16—299 33 Claims



1. In a variable tension device comprising a support adapted to be relatively fixedly mounted, an elongated torsion member non-rotatably secured to and extending axially from said support, a sleeve surrounding said torsion member and rotatable thereover, means for non-rotatably securing said sleeve to said torsion member at a point axially spaced from said support, and means for operatively connecting said sleeve to an external object rotatably movable relative to said support; the improvement which comprises said sleeve-torsion member securing means comprising (a) a part mounted on said torsion member

inside said sleeve, non-rotatably secured to said torsion member and said sleeve, and axially slidable relative to said torsion member and said sleeve, (b) said sleeve having an opening located axially between said part and said support, and (c) a link engaged with said part, extending toward said support, and passing under said sleeve opening, said sleeve opening providing access to said link, whereby said link may be engaged through said opening and moved axially, thereby to axially move said part to adjust the spacing between said part and said support, whereby the effective length of said torsion member can be varied at any time desired.

4,589,165

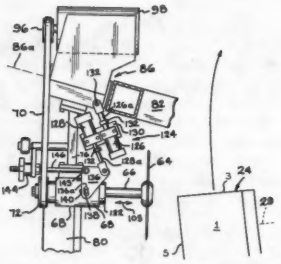
APPARATUS AND METHOD FOR CUTTING SLAUGHTERED POULTRY INTO SEPARATE PIECES

Hershey Lerner, Hudson; William M. Easter, Solon, and Rick S. Wehrmann, Hudson, all of Ohio, assignors to Automated Packaging Systems, Inc., Twinsburg, Ohio

Filed Jan. 4, 1985, Ser. No. 688,911

Int. Cl.⁴ A22C *21/00*

U.S. Cl. 17—11 **2 Claims**



1. An adjustable knife for use in a bird carcass cutting system, comprising:

(a) a circular knife mounted to a rotatable spindle;

(b) a bearing means rotatably supporting said spindle;

(c) a bearing housing slidably supporting said bearing means;

(d) a pair of interconnected, fluid pressure operated actuators, each actuator including an associated actuator rod;

(e) the actuating rod of one of said actuators coupled to said bearing means, the actuating rod of the other of said actuators connected to a remote pivot, such that said actuators and actuating rods define a linkage arm between said remote pivot and said bearing means, and

(f) means for selectively actuating said actuators to extend and retract the actuating rods of said actuators whereby the length of said linkage arm defined by said actuators is changed in discrete steps thereby to move said bearing means relative to said bearing housing.

4,589,166

PROCESS FOR DISINTEGRATING AND RECONSTITUTING A PAD OF FIBERS

Marcel Holvoet, Louviers, France, assignor to Beghin-Say S.A., Thumeries, France and Nicolas Drouzas, Antwerp, Belgium

PCT No. PCT/FR84/00031, § 371 Date Oct. 15, 1984, § 102(e) Date Oct. 15, 1984, PCT Pub. No. WO84/03309, PCT Pub. Date Aug. 30, 1984

PCT Filed Feb. 13, 1984, Ser. No. 667,494

Claims priority, application France, Feb. 15, 1983, 83 02370

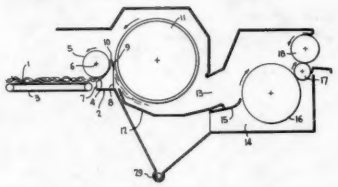
Int. Cl.⁴ D01G *11/00*

U.S. Cl. 19—82 **9 Claims**

1. A process for shortening textile fibers comprising

(a) continuously moving a pad of fibers between a trough-plate and a feed roller provided with a rounded roughness which rotates in the feed direction of the fiber pad and compresses said pad, the pressure exerted by said feed roller on said fiber pad being controlled so as to exceed 0.25 MPa;

(b) pulling the fiber pad beyond said roughness plate by means of a drum provided with a cutting roughness rotating in the same direction as the feed roller but at a tangential speed at least 50 times that of the speed of the feed roller; and



(c) tearing at least a part of the textile fibers having a length exceeding 10 mm of said fiber pad, said tearing being obtained by engaging said fibers with means located in a vertical space between the top of said trough-plate and the cutting roughness of said drum to cause said tearing of said textile fibers with a length in excess of 10 mm.

4,589,167

APPARATUS FOR INTRODUCING A PILE INTO A FOLLOWING ROLLER SYSTEM

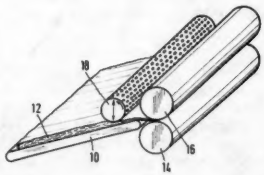
Siegfried Bernhardt, Bremen, Fed. Rep. of Germany, assignor to Spinnbau GmbH, Bremen, Fed. Rep. of Germany

Filed Mar. 22, 1985, Ser. No. 714,871

Claims priority, application Fed. Rep. of Germany, Mar. 22, 1984, 3410443

Int. Cl.⁴ D01G *15/46*

U.S. Cl. 19—106 R **12 Claims**



1. An apparatus for introducing a pile supplied from a carder comb via a conveyor belt into a calender, including a device for reducing the fattening of the pile before entry into the calender, comprising:

a pile compression and guiding device immediately preceding the calender for pressing the pile against the conveyor belt.

4,589,168

YARN-DRAFTING APPARATUS

Klaus E. Krieger, Kirchheim, Fed. Rep. of Germany, assignor to Zinser Textilmaschinen GmbH, Ebersbach, Fed. Rep. of Germany

Division of Ser. No. 465,991, Nov. 2, 1983, Pat. No. 4,506,414. This application Oct. 17, 1984, Ser. No. 661,670

Claims priority, application Fed. Rep. of Germany, Feb. 18, 1982, 3205880

The portion of the term of this patent subsequent to Mar. 26, 2002, has been disclaimed.

Int. Cl.⁴ D01H *5/32*

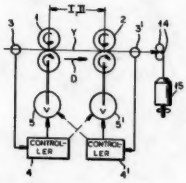
U.S. Cl. 19—240 **5 Claims**

1. In combination with a yarn spinner, a yarn-drafting apparatus comprising:

an upstream gripper roller assembly including at least an upstream roller pair gripping the yarn to be drafted;

a downstream gripper roller assembly including at least a downstream roller pair spaced from the upstream pair and also gripping the yarn;

a variable-speed drive means connected to the rollers of one of the assemblies for rotating the respective rollers and thereby passing the yarn from the downstream to the upstream assembly while drafting the yarn;



sensor means juxtaposed with the yarn adjacent the roller pair of the one assembly for determining the yarn size;

control means connected to the sensor and drive means for rotating the roller pair of the one assembly at a speed dependent on the detected yarn sizes; and

means at the other roller assembly for drafting the yarn thereat relatively greatly when it is relatively thick and for stretching it relatively little when it is relatively thin.

4,589,169

APPARATUS FOR PRODUCTION OF A NON-WOVEN FABRIC

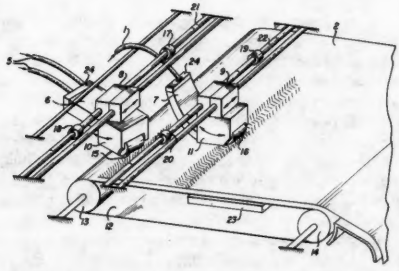
Karl Marx, Radebeul; Peter Offermann, Dresden; Ralf-Dieter Reumann, Dresden; Matthias Mägel, Dresden; Bertram Frenzel, and Dietmar Grenzendörfer, both of Karl Marx Stadt, all of German Democratic Rep., assignors to VEB Kombinat Textima, Karl Marx Stadt, German Democratic Rep.

Filed Jan. 12, 1984, Ser. No. 570,131

Claims priority, application German Democratic Rep., Mar. 25, 1983, 249171; Mar. 25, 1983, 249172

Int. Cl.[4] D01G *25/00*

U.S. Cl. 19—304 **6 Claims**



1. An apparatus for the production of a non-woven fabric which comprises a movable solid transport element, said element having a substantially planar and displaceable substantially horizontal transport surface, said transport surface being capable of supporting a non-woven fabric to be produced, means to place said transport surface in linear motion, and in a generally rectilinear transport direction, first means to feed a fiber flow stream containing a plurality of discrete individual fibers onto said moving transport surface, and at an angle of less than 90° to the transport direction of the non-woven fabric to be produced, means for reciprocating said first feed means across said transport surface substantially perpendicular to the direction of motion of said transport surface and means for pivotally adjusting said feed angle of said first feed means, said first means to feed said fiber flow stream transversely disposing the fibers of said fiber flow stream next to one another on said moving transport surface, so as to form a substantially rectilinear independently oriented first fiber layer on said moving transport surface, said first fiber layer being independently oriented substantially transversely to the direction of movement of said transport surface, means to combine said formed first fiber layer including lateral border areas of said formed first fiber layer, with a preceding independently oriented second fiber layer, so as to reinforce the thus produced non-woven fabric, and means to recover a product non-woven fabric from said solid transport element.

4,589,170

SINK FASTENERS

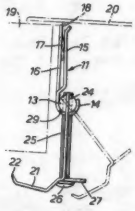
Michael A. F. Ponting, Gloucester, Great Britain, assignor to Springfast Limited, Gloucester, Great Britain

Filed Jun. 12, 1984, Ser. No. 620,077

Claims priority, application United Kingdom, Jun. 14, 1983, 8316170

Int. Cl.[4] A47B *77/06*

U.S. Cl. 24—456 **3 Claims**



1. A fastener comprising a clip for postively engaging a rail, a clamping member with lateral parallel guide fingers, a hinge pin connecting said member to the base of the clip and having guide slots at its ends to receive said guide fingers, and an intermediate screw-threaded transverse aperture aligned parallel to said slots, a screw engaged in said aperture and cooperating with said clamping member so that rotation of the screw adjusts the position of the clamping member in relation to the clip, and the clamping member being movable about the axis of the hinge pin between stable operative and non-operative positions, the latter removing it from projecting to any substantial extent to one side of a rail with which the clip is engaged, while the operative position brings a portion of the member to project to that side.

4,589,171

DEVICE FOR HOLDING AND POSITIONING TUBING OF I.V. ADMINISTRATION SET

Lee E. McGill, Orinda, Calif., assignor to Miles Laboratories, Inc., Elkhart, Ind.

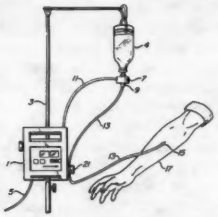
Filed Mar. 23, 1984, Ser. No. 592,993

Int. Cl.[4] A44B *21/00*; F16K *7/06*

U.S. Cl. 24—543 **5 Claims**

1. A device for holding and positioning plastic tubing of an intravenous fluid administration set, the device comprising a generally flat, elongate and foldable polymer structure having two outwardly extending arms connected via an intermediate flexible portion adapted to serve as a hinge for the two arms, the flexible portion having on opposite sides thereof substantially parallel longitudinal recesses which, when the arms are folded against one another, form a longitudinal channel, gener-

ally circular in cross section and capable of holding plastic tubing via a relatively tight, but non-fluid-flow-reducing friction fit, the arms including means for irreversibly locking the arms in a closed position.



4,589,172

CENTRAL BELT LOCK, PARTICULARLY FOR A PARACHUTE HARNESS

Michael Hoenigs, Rödermark, and Hermann Reuschenbach, Rossbach, both of Fed. Rep. of Germany, assignors to Autoflug GmbH, Rellingen, Fed. Rep. of Germany

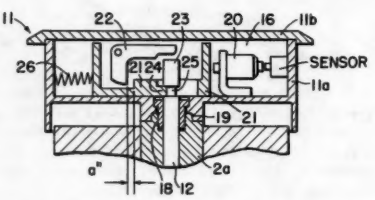
PCT No. PCT/DE81/00179, § 371 Date May 20, 1983, § 102(e) Date May 20, 1983, PCT Pub. No. WO82/01529, PCT Pub. Date May 13, 1982

PCT Filed Oct. 24, 1981, Ser. No. 391,162

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1980, 3040134

Int. Cl.⁴ A44B *11/26*

U.S. Cl. 24—602 **10 Claims**



1. A central belt lock, especially for parachutists-body-belts, comprising:

a housing having an inside surface;

a main journal which is manually rotatable and axially movable in said housing, said main journal being provided with at least one longitudinal bore;

an anchor plate operatively connected with said housing and arranged with a plurality of retaining bolts for belt attachment members;

a push rod operatively connected with said anchor plate and mounted in each longitudinal bore of said main journal, so that said push rod is longitudinally movable;

an actuator operatively connected with said push rod, said actuator including a sensor means operatively triggered upon contact with water for axial displacement of said push rod and hence of said anchor plate with said retaining bolts;

a rotary handle provided with said main journal for effecting manual rotation and axial movement, said rotary handle including an inner space which accommodates said actuator and transfer members for transferring movement from said actuator to said push rod;

said transfer members including an angle lever having operative pivotal mounting relative to said housing and via which said actuator acts on said push rod; and

a sliding contact which is mounted and arranged to be movable at right angles to said push rod; said sliding contact with said angle lever comprising said transfer members, said sliding contact being provided with a projection, with the movement of said actuator acting on said sliding contact for sliding movement of the sliding contact upon the inside surface of the housing so as to provide operative connection effective in pushing said projection thereof against said angle lever.

4,589,173

APPARATUS FOR CRIMPING SYNTHETIC FILAMENT GROUPS

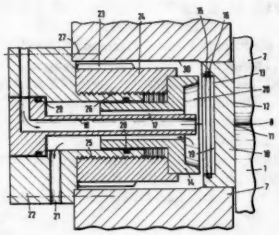
Gerold Fleissner, Chur, Fed. Rep. of Germany, assignor to Vepa Aktiengesellschaft, Switzerland

Filed Jul. 23, 1984, Ser. No. 633,253

Claims priority, application Fed. Rep. of Germany, Jul. 23, 1983, 3326589

Int. Cl.⁴ D02G *1/12*

U.S. Cl. 28—269 **7 Claims**



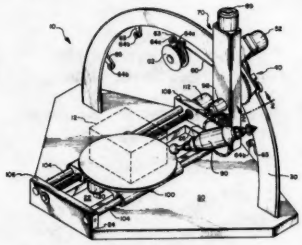
1. An apparatus for crimping synthetic filament yarns, groups, bundles, or strands comprising a pair of pressure rolls with a nip formed therebetween and a stuffer box arranged downstream thereof, said stuffer box comprising two panels aligned with respect to the rolls, a crimping chamber defined in part by said panels, one of said panels being pivotable at one end to move toward the other stationary panel in order to reduce the chamber volume, and two lateral plates delimiting the chamber on each side up to the pressure roll nip; the lateral plates being fixedly secured to the non-pivotable stationary panel, and the lateral plates each having embedded therein, at the level of nip between the pair of pressure rolls, a pressure plate in frictional engagement under pressure with the marginal zones of the roll end faces, said pressure plates being operatively associated with means for transmitting axial pressure thereto and with means for cooling the plates during operation of the stuffer box; each pressure plate being provided on a cooling end face with a central, circular groove in which can be inserted in the axial direction a cooling liquid supply and discharge unit of said cooling means; said circular groove having an annular sealing means adapted to seal around the unit when said unit is inserted into said groove, said axial pressure transmitting means engaging said unit for selective reciprocal movement thereof into and out of said groove for respective application of pressure to said plate and for permitting access thereto for replacement.

4,589,174

POLAR COORDINATE APPARATUS

Dell K. Allen, Orem, Utah, assignor to Brigham Young University, Provo, Utah

Filed Mar. 27, 1984, Ser. No. 593,730
Int. Cl.[4] B23C *1/12, 1/14*
U.S. Cl. 29—33 R 31 Claims



1. An apparatus for performing an operation on a workpiece, the apparatus comprising:

an implement adapted to performing said operation;

first means comprising a radial support arm for selectively positioning the implement along an arcuate path formed about a first axis, said arcuate path defining a plane;

second means for selectively positioning the implement along radii essentially within said plane and extending from the first axis to the arcuate path;

third means for selectively rotating the implement about either of a second and third axis, said second axis both intersecting said plane through said radial support arm and being substantially parallel to the first axis, and said third axis both intersecting said plane through said implement and being substantially parallel to the first axis; and

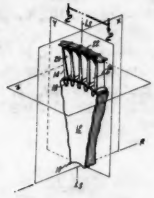
means for selectively bringing each portion of said workpiece into said plane, whereby the implement is able to selectively perform said operation on substantially every portion of said workpiece.

4,589,175

METHOD FOR RESTORING A FACE ON THE SHROUD OF A ROTOR BLADE

John P. Arrigoni, Wallingford, Conn., assignor to United Technologies Corporation, Hartford, Conn.

Division of Ser. No. 155,252, Jun. 2, 1980, Pat. No. 4,400,915.
This application Dec. 16, 1982, Ser. No. 449,892
Int. Cl.[4] B23P *15/02, 13/02*
U.S. Cl. 29—156.8 B 4 Claims



1. A method for restoring a tangential face on a tangential side of a shroud of a used rotor blade of the type adapted for use in an axial flow rotary machine, the rotor blade including a root and an airfoil which has dislocated axially and tangentially with respect to the root during use as compared with the airfoil and root of an identically designed unused rotor blade the identically designed unused rotor blade having a tangential face, comprising the steps of:

defining a desired tangential face for the shroud of the used blade by

locating the desired tangential face in the axial and vertical directions with respect to the root as the corresponding tangential face of the unused blade is located with respect to the root of the unused blade, and

locating the desired tangential face in the tangential direction with respect to the airfoil of the used blade as the corresponding tangential face of the unused blade is located with respect to the airfoil of the unused blade to adjust for the tangential dislocation of the airfoil of said used blade; depositing material on the tangential face of the used rotor blade;

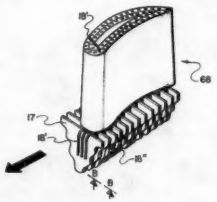
removing material from the tangential face until the tangential face and the desired tangential face are coincident.

4,589,176

FIBER-COMPOSITE TURBINE BLADE AND METHOD FOR ITS CONSTRUCTION

Irwin E. Rosman, and Jerhong Lin, both of Woodland Hills, Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Nov. 25, 1983, Ser. No. 555,302
Int. Cl.[4] B21K *3/04;* B27B *15/04*
U.S. Cl. 29—156.8 B 9 Claims



1. A method of manufacturing a fiber-composite turbine blade comprising an aerofoil and an integrally formed footing, said method comprising the steps of:

forming a blank in the general shape of said aerofoil with fiber-composite material, the fibers of said fiber-composite material being oriented in a substantially spanwise direction along said aerofoil blank, said aerofoil blank having a root;

exposing said fibers at said root;

forming a footing comprising a transversely meshed tape and fiber structure by transversely inserting a plurality of foot-forming fiber-composite tapes between said exposed fibers at said root;

filling voids in said transversely meshed tape and fiber structure with filler matrix material; and

compacting and bonding said filled structure to form said fiber-composite turbine blade.

8. A method of manufacturing a complex fiber-composite structure comprising a first member and an integrally formed transverse member, said transverse member being transverse to an axis of said first member, said method comprising the steps of:

forming a blank in the general shape of said first member with fiber-composite material, the fibers of said blank-forming fiber-composite material being oriented in the general direction of said axis;

exposing said fibers of said blank along a portion of said blank whereat said secondary member is to be integrally formed;

forming a transversely meshed tape and fiber structure by transversely inserting a plurality of transverse-member-forming fiber-composite tapes between said exposed fibers;

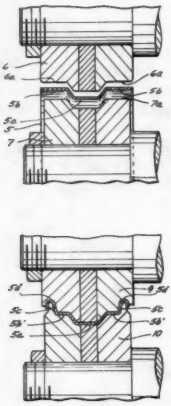
filling voids in said transversely meshed tape and fiber structure with filler matrix material; and

compacting and bonding said filled structure substantially to the desired shape of said complex fiber-composite structure.

4,589,177
METHOD OF MANUFACTURING, WITHOUT WELDING, LIGHT ALLOY RIMS FOR MOTOR VEHICLES

Nunzio Secolo, and Elio Gualchi, both of Turin, Italy, assignors to Teksid S.p.A., Turin, Italy

Continuation-in-part of Ser. No. 389,805, Jun. 18, 1982, abandoned. This application May 17, 1985, Ser. No. 735,820
Claims priority, application Italy, Feb. 25, 1982, 67203 A/82
Int. Cl.[4] B21K *1/38*
U.S. Cl. 29—159.1 3 Claims



1. A method of manufacturing a wheel rim for a motor vehicle, comprising the steps of:

(a) cutting off a section of an extruded cylindrical metal tube to produce a hollow cylindrical rim blank (5),

(b) subjecting the rim blank to a first step deformation in which only the central section (5*a*) of the blank is deformed radially inwardly, the diameter of the end sections 5(*b*) of the blank remaining substantially unchanged during the first step deformation,

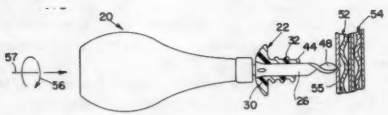
(c) subjecting the rim blank to a second step deformation in which only the edge portion (5*c*) of each end section (5*b*) is deformed radially outwardly, the diameter of each region (5*b'*) of each end section between its respective edge portion and the central section remaining substantially unchanged during the second step deformation, and

(d) gauging the deformed rim blank to produce the finished rim.

4,589,178
INSERTION TOOL

Stanley E. Staffeld, 1621 Woodsboro, Royal Oak, Mich. 48067

Division of Ser. No. 309,912, Oct. 8, 1981, Pat. No. 4,507,817. This application Feb. 20, 1985, Ser. No. 703,321
Int. Cl.[4] B25B *27/14*
U.S. Cl. 29—240 8 Claims

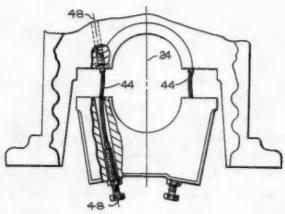


1. An insertion tool used to insert a connector through at least two plies of material in order to hold them together, said connector having a hollow body, said insertion tool comprising a handle and an elongated shaft connected to said handle, said shaft including a flat ribbon helix portion at the distal end thereof and an overall length which is greater than that of the connector, first means on said shaft for releasably holding said connector thereon, and second means on said shaft for holding said connector in non-rotating relationship thereon, said shaft having a tip at its outer end for penetration of said material and said shaft being dimensioned to fit within the hollow body of said connector.

4,589,179
FLEXIBLE POSITIONER

Thomas S. Hulting, Jr., East Peoria, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Filed Sep. 10, 1984, Ser. No. 648,914
Int. Cl.[4] B23P *19/04*
U.S. Cl. 29—256 4 Claims



1. A flexible positioner for use in positioning an article to a base, the article and base having retainer receiving holes located on each side of the article and the base and at an angle to each other, the flexible positioner comprising:

a first threaded rigid end portion for engaging the retainer receiving holes in the base;

a second elongate threaded rigid end portion;

means at a distal end of the second end portion for imparting rotational movement thereto;

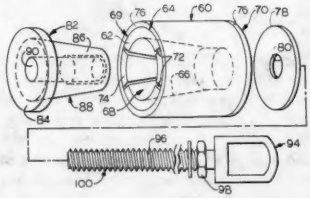
a flexible intermediate portion comprising an inextensible spirally wound cable attached to and extending between the end portions; and

a nut on the second end portion between the means at the distal end and the flexible intermediate portion movable along the second end portion for moving the article with respect to the base.

4,589,180
TOOL FOR REMOVAL OF AN ENGINE CYLINDER LINER

Louis F. Vachon, Washington, Ill., assignor to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 549,130, Nov. 7, 1983, Pat. No. 4,530,141, which is a continuation-in-part of Ser. No. 490,942, May 2, 1983, abandoned. This application Apr. 22, 1985, Ser. No. 725,719
Int. Cl.[4] B23P *19/04;* B25B *9/00*
U.S. Cl. 29—263 11 Claims



8. A tool for inserting into a tubular member and for grip-

ping said tubular member in response to a force applied on said tool, comprising:

a longitudinally-segmented, hollow mandrel having a circumferential wall and first and second ends, said circumferential wall having an outer surface defining a diameter of the mandrel and a tapered inner surface;

a driver having a base and a frusto-conical body portion insertable into said hollow mandrel and into engagement with its tapered inner surface, the frusto-conical body portion being movable to succeeding positions at which said frusto-conical body portion increasingly forcibly urges said outer surface to a correspondingly larger diameter;

means for applying a force on said driver to force it into the hollow mandrel and to said succeeding positions; and

a flexible cover on the outer surface of said circumferential wall to frictionally engage said tubular member.

4,589,181

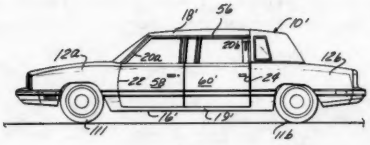
METHOD OF CONVERTING A SEDAN TO A LIMOUSINE

Charles W. Phillips, Boca Raton, Fla., assignor to Phillips Motor Car Corporation, Margate, Fla.

Filed Nov. 12, 1982, Ser. No. 441,321

Int. Cl.⁴ B60P *3/26*

U.S. Cl. 29—401.1 **14 Claims**



1. A method of converting a front wheel drive two-door production motor vehicle having two oppositely disposed side doors to a front wheel drive four-door limousine having a lengthened passenger compartment and a lengthened wheel base, said method comprising the steps of:

removing said two doors from the doorways on either side of the frame of said vehicle;

placing the vehicle on support means supporting the central portion of said motor vehicle;

severing said frame transversely at the passenger compartment across said doorways into a forward frame segment and a rearward frame segment;

separating said forward frame segment from said rearward frame segment;

inserting a roof frame segment between the roof portions of said separated frame segments and joining said inserted roof frame segment at each of its edges adjoining sections of said frame segments to said separated frame segments to form a single lengthened roof;

inserting a floor frame segment between the floor portions of said separated frame segments and joining said inserted floor frame segment at each of its edges adjoining sections of said frame segments to said separated frame segments to form a single lengthened floor and to form a rearward doorway on each side of said motor vehicle between said lengthened roof and said lengthened floor;

inserting a pillar having two ends between the roof and floor segments of said forward frame segment on each side of said frame and joining each said pillar at each of its ends to the adjacent segments of said forward frame segments, so as to form a forward doorway on each side of said frame ahead of each said pillar between said roof and said floor frame portions;

cutting each of said doors removed from said doorways on each side of said frame along a vertical line spaced a predetermined distance from the rear edge of said door to remove a forward portion of said doors;

attaching hinge means to the front edge of said doors; and

hingedly attaching each of said hinge means to one of said pillars such that said doors comprise rearward doors for said limousine to selectively close said rearward doorways.

4,589,182

METHOD AND APPARATUS FOR FORMING A SPACE SECTION IN A PAIR OF CONTINUOUS CONCEALED-SLIDE-FASTENER STRINGERS

Shigeru Imai, Namerikawa, Japan, assignor to Yoshida Kogyo K. K., Tokyo, Japan

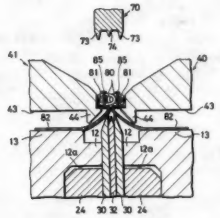
Filed Nov. 21, 1984, Ser. No. 673,732

Claims priority, application Japan, Nov. 25, 1983, 58-221599

The portion of the term of this patent subsequent to Apr. 16, 2002, has been disclaimed.

Int. Cl.⁴ B21D *53/54*; A41H *37/06*

U.S. Cl. 29—410 **10 Claims**



1. A method of forming a space section in a pair of concealed-slide-fastener stringers including a pair of continuous tapes carrying along their folded inner longitudinal edges a pair of rows of interengaged coupling elements, each coupling element row being attached to the respective folded tape edge by sewn stitches, said method comprising:

(a) clamping the tapes with the interengaged coupling elements disposed at the upper side of the tapes;

(b) with the tapes clamped, displacing the fastener stringers upwardly from the under side of the tapes by a pair of laterally spaced and vertically movable dies until head portions of a series of the interengaged coupling elements are exposed to the dies and then supported thereon;

(c) cutting certain interengaged coupling elements on the dies by a vertically movable punch coactive with the dies; and

(d) with the tapes clamped, pulling the cut coupling elements out of the sewn stitches by the punch and a vertically movable ejector with the cut coupling elements clamped between the punch and the ejector.

4,589,183

METHOD AND APPARATUS FOR UNDOING THE INTERCONNECTION BETWEEN STAMPED STACKS OF BAGS

Fritz Achelpohl, Lengerich, Fed. Rep. of Germany, assignor to Windmoller & Holscher, Lengerich, Fed. Rep. of Germany

Filed Aug. 27, 1984, Ser. No. 644,280

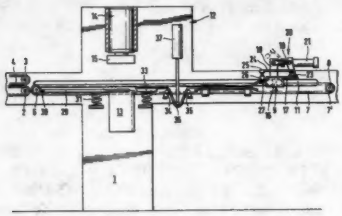
Claims priority, application Fed. Rep. of Germany, Aug. 29, 1983, 3331069

Int. Cl.⁴ B23P *19/00*

U.S. Cl. 29—426.5 **2 Claims**

1. A method of undoing the interconnection caused at the cut edges by stamping stacks of flattened workpieces of thermoplastic material, preferably plastics bags, characterized in

that leading ends of the stacks are engaged and, after stamping, at least trailing zones containing stamped-out recesses are



continuously bent whilst being pulled over at least one supporting edge.

4,589,184

METHOD AND APPARATUS FOR MOUNTING PARTS TO BOTH SIDES OF A MAIN BODY SUCH AS AN AUTOMOBILE BODY

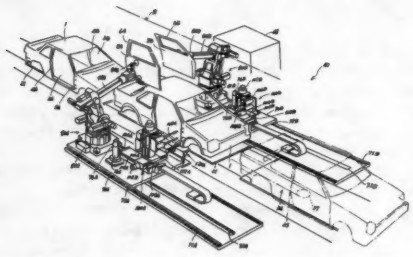
Kajio Asano, Sayama; Toshihiko Sato, Kawagoe; Haruo Oda, Sakai; Yasuaki Abe, Takatsuki, and Yoshitaka Watanabe, Takarazuka, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 3, 1985, Ser. No. 730,340

Claims priority, application Japan, Dec. 19, 1984, 59-269165; Dec. 24, 1984, 59-279124

Int. Cl.[4] B23P *11/00, 19/00;* **B23Q** *15/00;* **B65G** *43/10*

U.S. Cl. 29—430 **15 Claims**



1. A method of mounting parts to both sides of a main body characterized by moving a carriage at a predetermined speed along a specified path of transport with the main body placed on the carriage; moving a pair of movable tables in synchronism with the carriage in the same direction as the movement thereof, the movable tables being disposed at opposite sides of the transport path and each carrying at least one robot and an assembling device; causing the movable tables to support the main body during the synchronized movement; setting a part held by the robot in a specified position on the main body; attaching the part to the main body by the assembling device; and thereafter delivering the main body from the movable tables onto the carriage.

6. A method of mounting parts to both sides of a main body characterized by moving a carriage at a predetermined speed along a specified path of transport with the main body placed on the carriage; moving a pair of movable tables in synchronism with the carriage in the same direction as the movement thereof, the movable tables being disposed at opposite sides of the transport path and each carrying at least one robot and an assembling device; causing the movable table to support the main body during synchronized movement; setting a first part held by the robot in a first specified position on the main body during the synchronized movement; attaching the first part to the main body by the assembling device; thereafter stopping the two movable tables and the carriage at the same time; causing the robot to hold a second part during the stopping; causing the two movable tables and the carriage to run again in synchronism, thereafter causing the robot to set the second part in a second specified position on the main body and attaching the second part to the main body by the assembling device; and subsequently delivering the main body from the movable tables onto the carriage.

7. An apparatus for mounting parts to both sides of main bodies comprising a carriage for placing the main body thereon; first drive means for moving the carriage along a specified path of transport; a pair of movable tables disposed on opposite sides of the transport path and movable in parallel therewith; second and third drive means for driving the two movable tables; part supplying means for transporting a plurality of parts in a direction parallel to the transport path; a controller coupled to each of the first, the second, and the third drive means, for causing the carriage and the two movable tables to run in synchronism; a body receiving device mounted on each movable table for transferring the main body from the carriage onto the movable table and causing the movable table to support the transferred main body thereon during the synchronized running; at least one robot mounted on each movable table for receiving the part from the part supplying means and setting the part in a specified position on the main body in accordance with an operation instruction from the controller; and at least one assembling device mounted on each movable table for attaching the part set on the main body to the main body in response to an operation instruction from the controller.

4,589,185

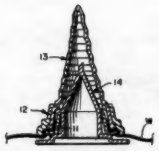
ACCESS PORT FORMING METHOD

Barry L. Schneider, Deerfield, Ill., assignor to Hollister Incorporated, Libertyville, Ill.

Division of Ser. No. 458,313, Jan. 17, 1983, Pat. No. 4,530,525. This application Feb. 11, 1985, Ser. No. 700,300

Int. Cl.[4] B23P *11/00*

U.S. Cl. 29—432 **7 Claims**



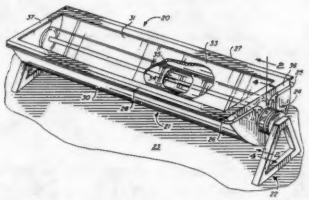
1. A method of forming an access opening in a wall of thin, flexible, stretchable thermoplastic material comprising the steps in order of placing a coupling ring about the body section of a piercing element having a generally conical portion extending axially beyond said ring; piercing said wall with said conical portion and advancing said element and ring to cause an annular axially-directed collar of stretched material to be positioned externally about said ring; positioning the resilient annular skirt portion of a tubular elastomeric nipple about said ring and collar; and then locking said resilient skirt portion tightly against said collar to seal said collar against both said skirt portion and said ring.

4,589,186

METHOD OF MAKING SOLAR HEATER

Gerald J. Tremblay, 7015 Leighton Way, Orlando, Fla. 32807

Division of Ser. No. 577,787, Feb. 7, 1984, Pat. No. 4,519,381.
This application May 6, 1985, Ser. No. 730,436
Int. Cl.[4] B23P *11/00*
U.S. Cl. 29—434 8 Claims



1. A method of making a solar heating apparatus comprising the steps of:

forming a pair of pre-cut, pre-sized rectangular sheets of metal having longitudinal edges and end edges in a curved form with a predetermined space therebetween;

capping the end edges of said spaced sheets of metal to form a closed end trough structure;

injecting an expandable polymer material between said spaced curved sheets;

expanding and curing said injected polymer material between said spaced curved sheets; and

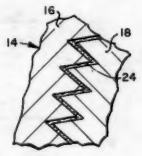
mounting a solar collector tube between said end caps in the trough structure of in said solar collector formed by said spaced sheets of metal, whereby a rapidly formed solar collector is produced.

4,589,187

METHOD OF MANUFACTURING AN INSULATING COUPLING FOR DRILL COLLARS

Frederick A. Stone, Durham, and Robert J. Maron, Cromwell, both of Conn., assignors to Teleco Oilfield Services Inc., Meriden, Conn.

Filed Jan. 23, 1984, Ser. No. 572,801
Int. Cl.[4] B23P *25/00*
U.S. Cl. 29—458 8 Claims



1. A method for forming an electrically insulating coupling for a drill collar having first and second tubular drill collar segments with mating threaded sections, including the steps of:

forming the threaded section of one of said drill collar segments of a reduced tubular wall thickness of from 0.002 to 0.006 inch relative to the desired finished dimension for threaded engagement with the mating threaded section of the other of said drill collar segments;

applying an electrically insulating ceramic coating of from 0.002 to 0.006 inch to said threaded section of said one drill collar segment to obtain the desired final dimension;

sealing the ceramic coating with a sealer effective to reduce porosity and

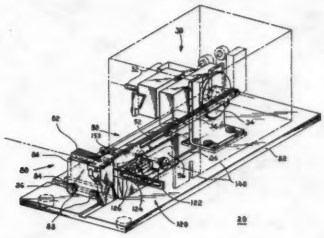
then threading said first and second sections together to form an electrically insulated drill collar.

4,589,188

TERMINAL PIN STRIP SEPARATOR

Timothy W. Houtz, Etters, and Charles M. Lovendusky, Enola, both of Pa., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Mar. 25, 1985, Ser. No. 715,969
Int. Cl.[4] B37D *37/12*
U.S. Cl. 29—566.2 22 Claims



1. Apparatus for broaching terminal pin strips, including laterally extending terminal pins embedded in and spaced along the longitudinal axis comprising:

a longitudinal, planar skiver blade;

means for reciprocating the skiver blade parallel to its, longitudinal axis; and

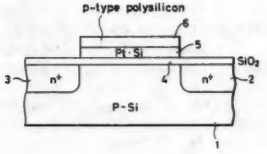
means for supporting the terminal pin strip so that the longitudinal axis of the bar is perpendicular to the plane of the blade, the blade having a plurality of skiving edges, each of which skives progressively deeper into the bar as the blade is reciprocated toward the terminal pin strip so that the bar is completely severed by the blade after a single reciprocation of the blade.

4,589,189

METHOD FOR PRODUCING A SCHOTTKY BARRIER LIGHT DETECTING DEVICE

Natsuro Tsubouchi, and Masahiko Denda, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 293,794, Aug. 18, 1981, Pat. No. 4,496,964.
This application Sep. 6, 1984, Ser. No. 647,790
Claims priority, application Japan, Aug. 19, 1980, 55-114490
Int. Cl.[4] H01L *21/443*
U.S. Cl. 29—571 5 Claims

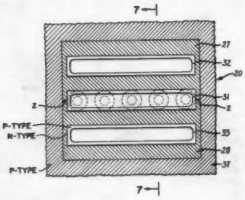


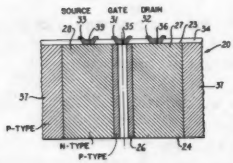
1. A method for producing a device for detecting light comprising the steps of: providing a semiconductor substrate of a first conductivity type; forming first and second impurity regions in a surface of said semiconductor substrate of a second conductivity type; forming an oxidation resistant layer upon said first and second impurity regions and remaining portions of said surface of said semiconductor substrate; forming a metallic layer on said oxidation resistant layer between said first and second impurity regions; and forming a polysilicon layer on said metallic layer.

4,589,190
FABRICATION OF DRILLED AND DIFFUSED JUNCTION FIELD-EFFECT TRANSISTORS

Thomas R. Anthony, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Mar. 23, 1984, Ser. No. 593,013
Int. Cl.[4] H01L *21/38, 21/465*
U.S. Cl. 29—571 **29 Claims**





1. A method of fabricating junction field-effect transistor device comprising the steps of:

(a) forming a plurality of spaced-apart, high-aspect-ratio substantially mutually parallel bases in and at least partially through a monocrystalline silicon semiconductor body of a first conductivity type by laser drilling, the bores being interposed between a first region and a second region of the body;

(b) forming in the body a plurality of spaced apart first zones of a second conductivity type by bringing a first impurity of a second conductivity type into contact with the inner surface of each bore and diffusing the first impurity a predetermined distance into the body from the inner surface such that each of the first zones is substantially concentric with a respective one of the bases and has a generally uniform cross-section; and

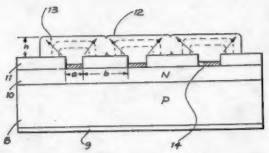
(c) forming first connection means making electrical contact with each of the first zones and second and third connection means for making electrical contact to the first and second regions of the body, respectively.

4,589,191
MANUFACTURE OF HIGH EFFICIENCY SOLAR CELLS

Martin A. Green, Waverley, and Andrew W. Blakers, Campbell, both of Australia, assignors to Unisearch Limited, Kensington, Australia

Filed Oct. 16, 1984, Ser. No. 661,897
Claims priority, application Australia, Oct. 20, 1983, PG1952
Int. Cl.[4] H01L *31/18*
U.S. Cl. 29—572 **11 Claims**

1. A method of manufacturing a solar cell comprising the steps of forming a layer of semiconductor containing a dopant of one conductivity type on a semiconductor layer containing a dopant of the opposite conductivity type to provide a junction therebetween, depositing a bottom metal contact layer on one of said semiconductor layers, forming a thin insulating layer on the other said semiconductor layer, forming a photosensitive layer on top of said insulating layer, masking the photosensitive layer to define the areas intended for contact between the top metal contact and the other said semiconductor layer, exposing the masked photosensitive layer to light to define the areas intended for contact between the top metal contact and the other said semiconductor layer, removing the photosensitive layer and the insulating layer from areas defined for contact between the top metal contact and the other said semiconductor layer, depositing a top metal contact layer in

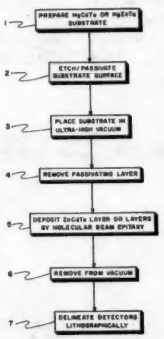


said areas followed by removal of excess metal deposited onto the insulating layer or photoresist layer, and depositing additional metal on top of the remaining metal to the thickness required to cause adjacent metal regions to join together in desired locations.

4,589,192
HYBRID EPITAXIAL GROWTH PROCESS

John H. Dinan, Alexandria, and William A. Gutierrez, Woodbridge, both of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Nov. 2, 1984, Ser. No. 667,699
Int. Cl.[4] H01L *21/363*
U.S. Cl. 29—572 **2 Claims**



1. A method of making at least one infrared detector from a low band-gap material, including the steps of:

(1) preparing a substrate with at least one HgCdTe or HgZnTe layer;

(2) etching and passivating said layer;

(3) placing said substrate in an ultra-high vacuum environment;

(4) removing the passivation from said layer;

(5) forming at least one ZnCdTe layer on said substrate by molecular beam epitaxy,

(6) removing said substrate from said ultra-high vacuum environment; and

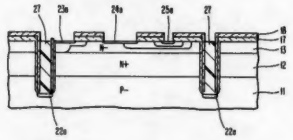
(7) delineating at least one detector on said substrate.

4,589,193

METAL SILICIDE CHANNEL STOPPERS FOR INTEGRATED CIRCUITS AND METHOD FOR MAKING THE SAME

George R. Goth; Thomas A. Hansen, and Robert T. Villetto, Jr., all of Poughkeepsie, N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 29, 1984, Ser. No. 626,278
Int. Cl.[4] H01L *21/76, 21/94*
U.S. Cl. 29—576 W 12 Claims



1. The method of forming a channel stopper at the bottom of an insulating trench formed through a N type conductivity layer into a lightly doped P⁻ silicon substrate in an integrated circuit comprising the steps of

coating said trench with an insulating layer;

removing said layer at least from the bottom of said trench; and

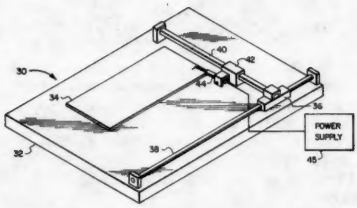
forming a channel stopper solely by depositing an appropriate metal at the bottom of said trench where said insulating layer was removed and sintering said metal with said silicon substrate to form a metal silicide rectifying contact.

4,589,194

ULTRASONIC SCRIBING OF THIN FILM SOLAR CELLS

Jeffery J. Roy, Newbury Park, Calif., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Dec. 29, 1983, Ser. No. 566,741
Int. Cl.[4] H01L *31/18*
U.S. Cl. 29—583 6 Claims



1. A process for separating a back contact of a thin film photovoltaic cell array into a plurality of separate back electrodes, one for each cell, where said back contact has been deposited as a continuous sheet over a semiconductor layer having an active region therein, comprising:

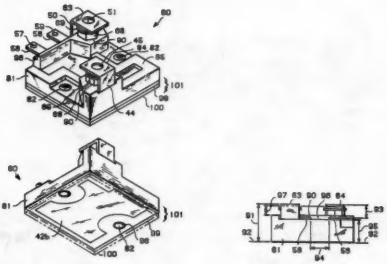
scribing preselected regions of said back contact sheet with an ultrasonically driven stylus at an average applied force and power level selected to penetrate all of said back contact sheet and at least a portion of said semiconductor layer.

4,589,195

METHOD OF FABRICATING A HIGH CURRENT PACKAGE WITH MULTI-LEVEL LEADS

Jerry M. Du Bois, Mesa, and Keith G. Spanjer, Scottsdale, both of Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Division of Ser. No. 534,261, Sep. 20, 1983, Pat. No. 4,518,982, which is a continuation of Ser. No. 238,799, Feb. 27, 1981, abandoned. This application Jan. 17, 1985, Ser. No. 692,134
Int. Cl.[4] H01L *23/34, 23/12, 23/48*
U.S. Cl. 29—588 5 Claims



1. A method for manufacturing a high current semiconductor device comprising:

providing a base electrode having a die attach portion adapted for receiving semiconductor die;

providing at a corner of said base electrode an extension portion adapted for forming a bent-up portion extending at substantially a right angle from said base electrode and a bent-over portion extending from said bent-up portion at a direction substantially parallel to said elongated portion;

providing a first electrode having an elongated portion adapted to be mounted on said base electrode, and an extension portion adapted for forming a bent-up portion extending at substantially a right angle from said elongated portion and a bent-over portion extending from said bent-up portion at a direction substantially parallel to said elongated portion;

providing a second electrode having an elongated portion adapted to be mounted on said base electrode and an extension portion adapted for forming a bent-up portion extending at substantially a right angle from said elongated portion and a bent-over portion extending from said bent-up portion at a direction substantially parallel to said elongated portion;

performing the following coupling and mounting steps in either order;

coupling at least one semiconductor die to said die attach area of said base electrode;

mounting said elongated portion of said first electrode on said base electrode on a first side of said die attach area parallel with said first side of said die attach area and

said elongated portion of said second electrode on said base electrode on a second side of said die attach area;

then electrically connecting a first region of said semiconductor die to said first electrode and a second region of said semiconductor die to said second electrode; and

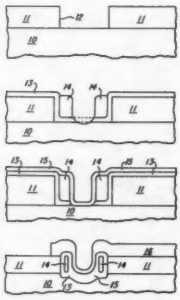
encapsulating a portion of said base electrode, first electrode, and second electrode.

4,589,196

CONTACTS FOR VLSI DEVICES USING DIRECT-REACTED SILICIDE

Dirk N. Anderson, Plano, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 11, 1984, Ser. No. 659,610
Int. Cl.[4] H01L *21/24*
U.S. Cl. 29—591 10 Claims



1. A method of making contact to a face of a semiconductor body through an aperature in an insulating layer on said face, comprising the steps of:

(a) depositing a thin layer of conductive material on said face to cover the semiconductor body within said aperture and also to cover the insulating layer and the sidewalls of the aperture,

(b) depositing a layer of semiconductor material over said conductive material and etching said layer of semiconductor material from said face but leaving the layer in place on the sidewalls,

(c) depositing another thin layer of conductive material on said face to extend continuously over the insulator and over the layer of semiconductor material and down the sidewall into the aperature,

(d) reacting the thin layer of conductive material with the semiconductor material to form a silicide/semiconductor material structure,

(e) removing unwanted residue of said thin and said another thin layers of conductive material from said insulating layer,

(f) depositing a metal layer over said insulator to make contact to the reacted conductive material and semiconductor material at said aperture.

4,589,197

COMPOSITE CATHODE FOR ELECTROCHEMICAL CELL

John M. North, Newbury, England, assignor to United Kingdom Atomic Energy Authority, London, England

Filed Apr. 24, 1985, Ser. No. 726,661
Claims priority, application United Kingdom, May 14, 1984, 8412304
Int. Cl.[4] H01M *4/62, 6/18*
U.S. Cl. 29—623.1 3 Claims

1. A method of making a solid state electrochemical cell comprising the steps of

(a) making a composite cathode therefore by forming a sheet or film from a solution in a solvent therefore of an insertion electrode material and of a polymeric material capable of forming a complex with a Li salt, and rolling the sheet or film at sufficient pressure to cause densification thereof; and

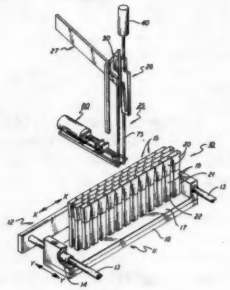
(b) assembling a cell comprising the composite cathode, an anode having lithium as its active material and an electrolyte comprising a polymeric material capable of forming a complex with Li salt, a Li salt being complexed with the polymeric material to form an ionically conducting phase in one or both of the composite cathode and the electrolyte.

4,589,198

TUBE LOADING APPARATUS

James E. Greever, Dewitt, and Kenneth P. Gray, East Syracuse, both of N.Y., assignors to Carrier Corporation, Syracuse, N.Y.

Division of Ser. No. 564,608, Dec. 22, 1983, Pat. No. 4,547,952.
This application Jul. 1, 1985, Ser. No. 749,972
Int. Cl.[4] B23P *11/02*
U.S. Cl. 29—709 7 Claims



1. Apparatus for automatically loading hairpin tubes into a magazine for temporarily storing the hairpin prior to insertion into a fin pack coil, said apparatus including

a magazine having a series of open-ended, vertically aligned, compartments for storing hairpin tubes therein,

indexing means for bringing each of said open-ended compartments into a tube loading station,

conveyor means for feeding a tube into the loading station with the legs of the tube disposed downwardly over the open end of a compartment indexed therein,

gripping means for biasing the legs of a hairpin in said loading station inwardly so that said legs can freely enter the open end of the said compartment,

ram means extendable to eject the said hairpin downwardly into the said compartment and

automatic control means for sequentially activating the gripping means and the ram means to pass a tube in the loading station into the said open-ended compartment.

4,589,199

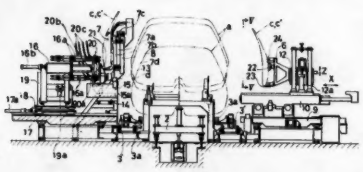
APPARATUS FOR ASSEMBLING A DOOR ON A VEHICLE BODY

Keizaburo Ohtaki, Saitama; Ryo Niikawa, Sayama, and Masahide Kondou, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed May 16, 1985, Ser. No. 734,731
Claims priority, application Japan, May 16, 1984, 59-96393; May 16, 1984, 59-70404[U]
Int. Cl.[4] B23P *19/00, 11/00;* B23Q *15/00;* B65G *43/10*
U.S. Cl. 29—714 2 Claims

1. An apparatus for assembling a door for a vehicle wherein a set jig for positioning and setting thereon a door is provided on a side portion of an assembling station, and the set jig is arranged to be movable to advance toward and retreat from a door opening portion of a vehicle body set on the assembling station so that the door may be assembled with the door opening portion by an advance movement of the set jig, the apparatus characterized in that the set jig is so arranged as to be movable in the vehicle length direction and in the vehicle height direction by respective driving sources from a predetermined original point position thereof corresponding to a nor-

mal set position of the door opening portion, and in that there is provided a position detecting means for detecting a deviation in position of the door opening portion from the normal set position thereof so that the original point position of the set jig



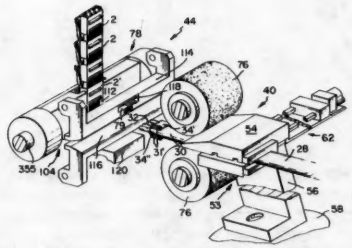
may be compensated, before the advance movement of the set jig, in accordance with the deviation in position of the door opening portion by operating the respective driving sources by a signal outputted from the detecting means.

4,589,200

APPLICATOR FOR APPLYING AN ELECTRICAL CONNECTOR TO A CABLE

Richard A. Burgit, Middletown; Newton G. Davis, Harrisburg; Josita M. Goyert, Elizabethtown; Keith Johnson, Jr., Manheim; Robert A. Long, and Joseph F. Stachura, both of Harrisburg, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.

Filed Jun. 24, 1985, Ser. No. 748,102
Int. Cl.[4] H01R *43/04*
U.S. Cl. 29—753 **9 Claims**



1. An applicator for applying an electrical connector to an electrical cable, the applicator comprising:

a frame;

a roller rotatably mounted in a bore in the frame, and defining a connector receiving recess having first and second mouths opening in respective orthogonal directions radially of the roller;

an anvil in the recess, facing the first mouth;

a connector magazine on the frame, communicating with said bore therein;

a die mounted in the frame for movement through a working stroke towards said recess and a return stroke away therefrom;

means for moving the roller between a first position in which said second mouth is in register with the magazine to receive a connector therefrom and a second position in which said first mouth and said anvil face said die; and

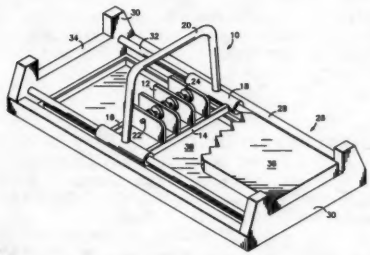
means for moving said die through its working stroke to apply, in the second position of said roller and in cooperation with said anvil, a connector in said recess to a cable inserted thereinto through said first mouth, and for subsequently moving said die through its return stroke.

4,589,201

PARALLEL ROLLER TOOL FOR UNLOADING SEMICONDUCTOR DEVICE SOCKETS

Carlos A. Kissinger, and Raun L. Goode, both of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 17, 1985, Ser. No. 724,362
Int. Cl.[4] H05K *3/30*
U.S. Cl. 29—764 **10 Claims**



1. A parallel roller tool for rapid unloading of semiconductor device sockets comprising:

a roller frame assembly holding a plurality of roller support plates in a parallel, spaced-apart relationship;

a plurality of cylindrical roller axles, one each mounted within and perpendicular to each of said roller plates, extending on either side of said roller plate, for rotating within each said roller plate coaxially with the roller axles in the other roller support plates; and

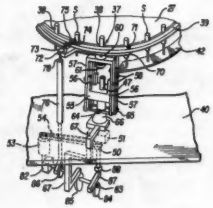
a plurality of pairs of cylindrical rollers one of each mounted on the facing ends of each adjacent roller axle coaxially therewith and for rotating therewith, each pair to apply simultaneous pressure on either side of the semiconductor device socket to permit the release of a semiconductor device.

4,589,202

APPARATUS FOR CRIMPING EDGES OF WORKPIECES

Walter Shields, 181-41 Henley Road, Jamaica, N.Y. 11432

Filed Aug. 6, 1984, Ser. No. 637,932
Int. Cl.[4] B23P *19/00*; B65B *7/28*
U.S. Cl. 29—822 **20 Claims**



1. An apparatus for crimping edges of workpieces comprising:

means for consecutively supplying the workpieces,

a rotary support member situated under the workpiece supplying means for supporting the workpiece one by one during crimping,

a crimping device including a base member immovably situated under the workpiece supplying means, a first frame pivotally connected to the base member, a crimping member rotationally connected to the first frame, a roller connected to said crimping member so that when the roller rotates, the crimping member rotates as well, and

means for pivotally moving the frame relative to the base member, and

a driving mechanism including first driving means for rotating the rotary support member, second driving means for reciprocally moving the rotary support member toward the workpiece supplying means, and third driving means for operating the frame moving means, said third driving means when actuated, urging the frame to incline relative to the base member so that when the workpiece is situated on the rotary support member, the roller contacts the rotary support member and the crimping member touches the edge of the workpiece, whereby the crimping member rotates and crimps the edge of the workpiece on the rotary support member.

4,589,203

METHOD AND APPARATUS FOR THE CRYOGENIC STRIPPING OF ELECTRIC CABLES

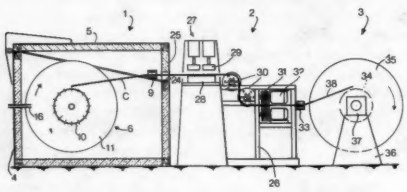
Raymond Le Diouron, Voiron, France, assignor to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Aug. 7, 1984, Ser. No. 638,622

Claims priority, application France, Aug. 26, 1983, 83 13748

Int. Cl.⁴ H05K *3/00*; F25C *5/02*

U.S. Cl. 29—829 **16 Claims**



1. A method for effecting a cryogenic stripping of an electric cable or the like comprising at least a sheath which is brittle at low temperature and a metal core deformable at said temperature, said method comprising cooling the cable with a cryogenic agent in a container, subjecting the cable to mechanical stresses at the outlet of said container and winding the cable on to a take-up reel, the whole of the cable to be stripped being cooled in said container and the extraction of the cable from the container being commenced when the sheath has reached a temperature at which the sheath becomes brittle.

10. An apparatus for effecting a cryogenic stripping of electric cables or the like, comprising a cooling container, means for feeding cryogenic agent to the container, a drum operably associated with said container for receiving the cable to be stripped wound thereon, means operably associated with said container for rotatably mounting the drum inside the container, the container having an outlet for cable unwound from the drum, means for mechanically stressing the cable located adjacent said outlet thereby to strip from the cable material rendered brittle by said cryogenic agent in said container, and a take-up reel for the stripped cable located adjacent said stressing means.

4,589,204

EATING UTENSIL

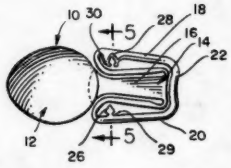
Allen J. Vogel, Schaumburg, Ill., assignor to Courtesy Mold & Tool Corporation, Wheeling, Ill.

Filed Nov. 21, 1984, Ser. No. 674,029

Int. Cl.⁴ A47G *21/04*

U.S. Cl. 30—324 **9 Claims**

1. A collapsible eating utensil comprising food engaging means and integrally formed handle means joined with said food engaging means, said handle means comprising a stem secured to said food engaging means, means adapted to be moved from folded position adjacent said stem to extended position in substantially longitudinal alignment with said stem, and locking means for retaining the handle means in extended position, said extension means comprising spaced apart segments adapted to be folded upon one another adjacent the



stem, said locking means comprising complementary interengaging means on the segments, said interengaging means comprising a male member on one segment adapted to engage within a female member on the other segment.

4,589,205

INNER CUTTER FOR ELECTRIC SHAVERS

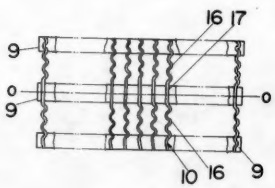
Masao Tanahashi, Hikone, Japan, assignor to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Feb. 27, 1984, Ser. No. 584,266

Claims priority, application Japan, Mar. 28, 1983, 58-52246

Int. Cl.⁴ B26B *19/12*

U.S. Cl. 30—43.8 **8 Claims**



8. In an electric shaver having an outer sharing plate perforated to receive hairs to be cut when said shaver is moved over a hair growing surface, an inner cutter for reciprocal movement with respect to the shear plate comprising:

a plurality of cutting blades each disposed in parallel, said cutting blades having peripheral first edge portions separated by a second edge portion, like edge portions of said blade being adjacent and parallel to like edge portions of an adjacent cutting blade, said first edge portions comprising a toothed edge for cutting longer hairs entering the periphery of said shear plate, and said second edge portions comprising a substantially straight edge for cutting hair previously cut by said first edge portions, whereby during use of said shaver, said hair is initially cut by said longer hair cutting first edge portions and subsequently cut by said shorter hair second edge portions.

4,589,206

SLICING KNIFE AND BOARD

Emery Marcoux, 53, chemin du Grand Moulin, Deux-Montagnes, Canada (J7R 3C3)

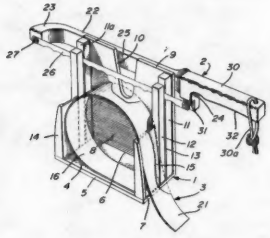
Filed Sep. 24, 1984, Ser. No. 653,207

Int. Cl.⁴ A21C *15/04*; B26B *3/03*

U.S. Cl. 30—114 **21 Claims**

13. A support board for supporting a mass of food for slicing the same into slices of equal thickness, comprising a base plate, an upstanding abutment wall at one end of said base plate, upstanding lateral guides adjacent said abutment wall and at

each side thereof, said abutment wall as high as said lateral guides, each guide having a vertical slot extending upwardly from the base plate and opening at the ends of the guide, the slots being in a plane parallel to said abutment wall and a distance selected in accordance with the thickness of the slice to be cut, said abutment wall having an outer face opposite said face facing said slot, said outer face being free of any obstruction, in combination with a slicing knife comprising a bow frame having a straight intermediate portion and inturned end portions, a knife blade extending between and attached at its ends under tension to said bow frame end portions, with the plane of said blade normal to the plane of said bow frame, a



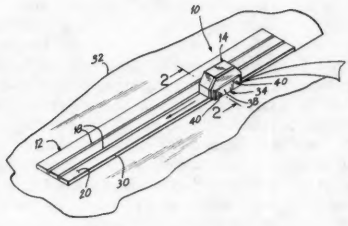
handle extending from one end of said bow frame, said handle having a longitudinal axis lying in the plane of said blade, said bow frame intermediate portion having a face proximate to said blade which is straight and spaced from said blade a distance sufficient for said blade to engage said slots with said bow frame on the exterior of said abutment wall and wherein both said bow frame end portions have similar handle coupling means and said handle has matching coupling means at one end, whereby said handle can be removably and selectively secured to anyone of said bow frame end portions by said handle coupling means and said matching coupling means, with the handle longitudinal axis lying in the plane of said blade.

4,589,207

WALLPAPER TRIMMER

Andrew Loth, and George Spector, both of 233 Broadway Rm 3615, New York, N.Y. 10007

Filed Jul. 23, 1984, Ser. No. 633,868
Int. Cl.[4] B26B *29/00*
U.S. Cl. 30—287 **3 Claims**



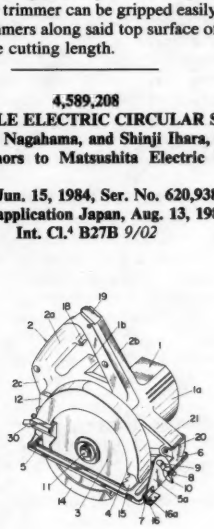
1. A wall paper trimmer which comprises:
(a) an elongated straight edge having at least one longitudinal groove within the top surface;
(b) a body member having a front face, a rear face, a flat bottom face and a lug extending downwardly from said flat bottom face at said rear face, said lug engages said groove of said straight edge so that said flat bottom face of said body member can slide along said top surface of said straight edge; and
(c) a razor blade carried by said front face of said body member perpendicular to said flat bottom face so that said razor blade can slide along an edge of said straight edge to cut wall paper, further comprising means for holding said razor blade against said front face of said body member, wherein said means for holding said razor blade against said front face of said body member comprises:
(a) a pair of spaced apart threaded grommets placed within said front face of said body member;
(b) a plate having a pair of spaced apart apertures therethrough; and
(c) a pair of bolts, each said bolt placed through each said aperture in said plate to threadably engage each said threaded grommet to hold said razor blade against said front face of said body member whereby said plate extends beyond said front face parallel to and overlapping said straight edge, wherein said front face of said body member further having a parallel recess to engage said razor blade so that when said plate is secured to said front face said recess will hold said razor blade in proper position for cutting said wallpaper wherein said recess is on said front face of said body member comprising an enlarged portion of said front face and having a plurality of notches in upper corner so that top edge of said razor blade can be adjustably positioned within one of said notches in said recess to change depth of cut of said razor blade in combination with a second wall trimmer further comprising:
(a) a hooked arm extending outwardly from one side of said body member to engage second said wallpaper trimmer so that said wallpaper trimmers are longitudinally aligned side by side; and
(b) a handle extending from top of said body member so that said wallpaper trimmer can be gripped easily to slide both wallpaper trimmers along said top surface of said straight edge to double cutting length.

4,589,208

PORTABLE ELECTRIC CIRCULAR SAW

Juzaemon Iwasaki, Nagahama, and Shinji Ihara, Hikone, both of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan

Filed Jun. 15, 1984, Ser. No. 620,938
Claims priority, application Japan, Aug. 13, 1983, 58-148533
Int. Cl.[4] B27B *9/02*
U.S. Cl. 30—376 **12 Claims**



1. A portable electric circular saw which comprises:
an electric motor;
a housing for accommodating the motor;
a circular saw blade operatively connected to the motor to be driven thereby to rotate and disposed on one side of the housing;
a fixed safety guard secured to the housing to enclose the upper portion of the saw blade;
a base plate upon which said housing is supported and which is adapted to engage the upper surface of a workpiece to be sawed;
a bracket including a portion connected at its one end to the housing and pivotally connected at its opposite end to the

base plate in such a manner that the housing is tiltable relative to the base plate about an axis within the plane of the saw blade for adjustment of the angle of the cut; and

fastening means for fastening the bracket to the base plate to prohibit the pivotal movement thereof;

wherein the connecting portion of said one end of the bracket with the housing, the fastening portion of the intermediate position of the bracket to the base plate, and the pivotally connecting portion of said opposite end of the bracket with the base plate are arranged generally in a line.

4,589,209
WOODWORKING PLANE

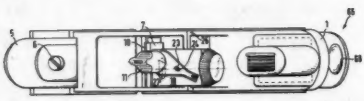
Frank W. Zarges, Bismarckstrasse 26, D-8130 Starnberg, and Gerd Stiegler, Freiberg, both of Fed. Rep. of Germany, assignors to Frank W. Zarges, Starnberg, Fed. Rep. of Germany

Filed Mar. 6, 1984, Ser. No. 586,674

Claims priority, application Fed. Rep. of Germany, Mar. 8, 1983, 3308192; Apr. 12, 1983, 3313110

Int. Cl.[4] B27G *17/02*

U.S. Cl. 30—478 **14 Claims**



1. Plane comprising: a frame with a plane base contact surface; an interchangeable iron displaceable at an angle to the contact surface of said frame along a direction in which the plane travels and on each side of a midposition parallel to said contact surface and transversely with respect to a direction in which the plane travels; a support for securing said interchangeable iron in a predetermied position; said support comprising a compound slide with a holder, said iron resting fixedly against said holder; said compound slide having a support component displaceable transversely on said frame; said holder being mounted on said support component for displacement inclined to said contact surface in longitudinal direction of motion of the plane, said support component being displaceable on said frame parallel to said contact surface and perpendicular to longitudinal displacement of said iron, said iron being displaceable on both sides from a midposition by at least an amount so that a cutting end of said iron can be displaced at least to each outer surface of a neighboring plane side wall.

4,589,210
METHOD AND MEANS FOR CENTERLESS CIRCLE CONSTRUCTION

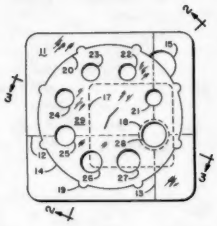
Joseph D. Konrad, 6340 Stumph Rd., Parma Heights, Ohio 44130

Continuation-in-part of Ser. No. 486,106, Apr. 18, 1983, abandoned, which is a continuation-in-part of Ser. No. 321,471, Nov. 16, 1981, abandoned. This application Apr. 30, 1984, Ser. No. 605,208

Int. Cl.[4] B43L *13/20*

U.S. Cl. 33—27.03 **5 Claims**

1. A template set for constructing curvilinear figures consisting of an exterior holder with a cavity defining an interior conformation and a recess extending through the holder; a large-circle guide portion adapted to fit into said cavity of said exterior holder and a shim with an exterior perimeter adapted to fit into said recess, said large-circle guide portion being complementary in size and shape with said interior conformation of said exterior holder and including a plurality of curvilinear cutouts, the exterior perimeter of said shim being complementary in size and shape with said recess of said exterior holder; said shim including at least one opening, whereby, when one of said curvilinear cutouts of said large-circle guide



portion is aligned with said opening of said shim, a user can construct a curvilinear figure.

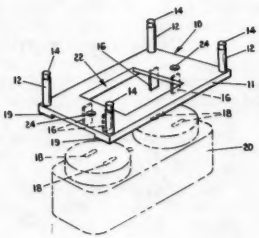
4,589,211
PANELING TEMPLATE

Stanley J. Policka, 5145 S. Martin Rd., Muskegon, Mich. 49441

Filed Mar. 13, 1985, Ser. No. 711,358

Int. Cl.[4] G01B *3/14*; B25H *7/04*

U.S. Cl. 33—189 **4 Claims**



1. A template for marking the position of an electrical outlet box on the reverse side of wall paneling, said template being formed of non-conductive material and comprising:

a base;

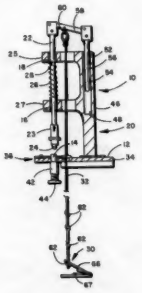
raised protrusions on the outer side of the base and positioned to form the corners of a rectangle conforming to the size of the desired opening in the wall paneling for the outlet box, said protrusions including marking tip means thereon for marking the positions of the protrusions on the back of a panel pressed against the template;

a plurality of prongs protruding inwardly from the inner side of the base and being shaped and positioned to fit into the plug slots in an electrical plug receptacle, said prongs being resilient and flexible such that they can be bent over and out of the way, such that the template can be placed flush to the wall over an electrical switch;

an electrical switch opening located in the middle of the template through which the toggle of an electrical switch can be placed; and

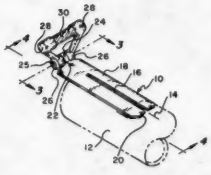
at least one screw aperture extending through the base in line with a threaded switch plate screw opening in the switch, such that the template can be affixed to an electrical switch by a threaded fastener extending through the screw aperture into threaded engagement with the switch plate opening in the switch.

4,589,212
METHOD AND APPARATUS FOR FASTENER PLACEMENT ON GARMENTS
Afif Tame, 20805 Victor St., Torrance, Calif. 90503
Filed Apr. 12, 1985, Ser. No. 722,851
Int. Cl.[4] A41H 25/00
U.S. Cl. 33—190 7 Claims



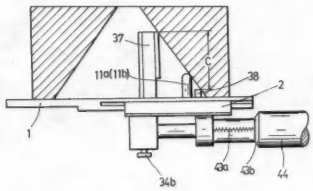
1. An apparatus for marking mating male and female fastener locations on garments comprising a flat platform, a first marking means located at said flat platform, a scale mounted on said platform adjacent to said first marking means, pointer means mounted on said scale and adjustably moveable in a transverse direction relative to said first marking means, guide means spaced from said platform in longitudinal alignment with said first marking means, mounting means holding said guide means in spatial separation from said platform, a rod reciprocally mounted in said guide means, second marking means carried by said rod and directed toward said first marking means, biasing means disposed to urge said rod away from said platform, and actuating means for overcoming said biasing means to draw said second marking means toward said first marking means.

4,589,213
CONDUIT BENDING LEVEL
William Woodward, 141 Crafton Ave., Pitman, N.J. 08071
Filed Mar. 11, 1985, Ser. No. 710,362
Int. Cl.[4] G01C 9/00
U.S. Cl. 33—371 6 Claims



1. A conduit bending device to attach to the end of a conduit to maintain the plane of the conduit through a series of bends, comprising:
(a) a body member having a front end positionable proximate to the end of the conduit, a rear end positionable on the top of the conduit, and a slot through the member extending from the rear end along the length of the body member toward the front end of a size and shape to allow a mark to be affixed on the top of the conduit,
(b) attachment means to detachably attach the body member to the end of the conduit,
(c) a level vial,
(d) a vial holding member means to hold the vial transverse of the center line of the conduit, and
(e) a pivot means attaching the vial holding member means to the body member and allowing the vial to be pivoted upwardly or downwardly in a single radial plane.

4,589,214
TAPER MICROMETER
Yih H. Liu, and Jiin Y. Hour, both of Kao Hsiung, Taiwan, assignors to Ming-Sheng Juan, Kao Hsiung and Ching-Fu Tsai, Hsien, both of, Taiwan
Filed Mar. 30, 1984, Ser. No. 595,452
Int. Cl.[4] G01B 5/24
U.S. Cl. 33—531 6 Claims



1. A taper micrometer comprising:
a centering means for contacting a tapered surface and establishing a base line perpendicular to the axis of a cone having a surface containing a straight line defined between two points on said tapered surface between which a taper is to be measured, said base line, said axis and said straight line being coplanar; and
a measuring means for determining distances between said points both in the direction of said axis and the direction of said base line and using the distances for indicating said taper between said two points, wherein said centering means includes:
a straight piece having a longitudinal axis for being set perpendicular to said axis of said cone; and
two datum pieces symmetrically provided on opposite sides of the longitudinal axis of said straight piece and capable of contacting said tapered surface
whereby when said two datum pieces contact said tapered surface said longitudinal axis is coincident with said base line.

4,589,215
APPARATUS FOR AFTER-TREATING POLYOLEFIN POWDER
Masamitsu Iwasaki; Takeshi Suzuki; Takashi Koizumi, all of Ichiharashi; Takehiko Takahashi; Kazumasa Shibata, both of Chibashi; Nobutoshi Komori, and Atsuyoshi Shimizu, both of Ichiharashi, all of Japan, assignors to Chisso Corporation, Osaka, Japan
Filed Nov. 14, 1984, Ser. No. 671,605
Claims priority, application Japan, Nov. 24, 1983, 58-221163
Int. Cl.[4] F26B 17/20
U.S. Cl. 34—182 5 Claims

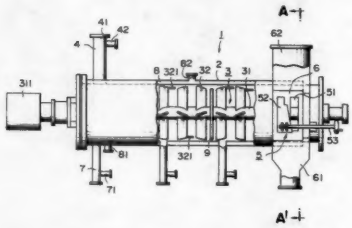
1. An apparatus for after-treating polyolefin powder comprising
(a) a horizontal cylindrical vessel for treating polyolefin powder, said vessel having a length to diameter ratio of 3 or greater,
(b) a stirrer mounted axially within said vessel, said stirrer comprising a plurality of sets of stirring blades mounted on a shaft, means for rotating said shaft, said plurality of sets of stirring blades being fitted to said shaft at plurality of spaced apart positions along the length of said shaft; each of said sets consisting of 4 or less mainly flat plates that are fitted radially along the shaft and perpendicular to

said shaft, the blades in each set being inclined toward the same direction in the same set, but toward the opposite direction in the next adjacent set, each set of blades being spaced from the next adjacent set a distance which is 0.3–2.0 times the width of a blade in such sets,

(c) an inlet pipe for introducing untreated polyolefin powder and heating gas, located adjacent one end of said horizontal cylindrical vessel,

(d) A plurality of heating gas inlets positioned along the length of said vessel for the introduction of heating gas,

(e) a variable barrage for controlling the amount of polyolefin powder held inside of said horizontal cylindrical vessel,

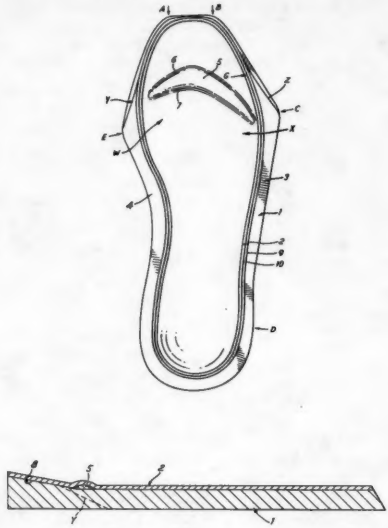


(f) an outlet for discharging after-treated polyolefin powder and gas located adjacent to said variable barrage and at the end of said vessel which is furthest removed from said inlet end,

(g)inlet pipes for heating gas, having attached pipes for feeding after-treating agent, said inlet pipes being provided at a plurality of positions of the bottom of and along the longitudinal direction of said horizontal cylindrical vessel, and

(h) indirect heating means for heating the inside of said horizontal cylindrical vessel through the cylindrical wall of said horizontal cylindrical vessel.

to the toe end of the front sole part, the front sole part having a raised portion of substantially arcuate shape provided in the



area of the front sole part which underlies the base of the wearer's toes.

4,589,217
Patent Not Issued For This Number

4,589,216
SOLE ELEMENT

Roy Fuscone, 58 Grange Road, London W5, England

Filed May 16, 1984, Ser. No. 610,661
Claims priority, application United Kingdom, May 18, 1983, 8313779
Int. Cl.[4] A43B *13/00*
U.S. Cl. 36—32 R **26 Claims**

1. A sole element for a shoe, the sole element comprising a heel part and a front sole part, the thickness of the heel part being uniform, the thickness of the front sole part increasing from a position corresponding to the ball of the wearer's foot

4,589,218
MULTI-STACK CARTRIDGE MAGAZINE FOR FIREARMS

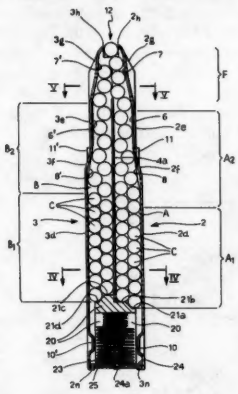
Roberto Teppa, Turin, Italy, assignor to Sites S.p.A., Mondovi, Italy

Filed Jun. 26, 1984, Ser. No. 624,844
Int. Cl.[4] F41C *25/02*
U.S. Cl. 42—50 **1 Claim**

1. A cartridge magazine for firearms, of the type comprising an elongate container with an end opening for the passage of a cartridge and an elevator member movable in the container under the action of resilient means, said container being intended to hold a plurality of cartridges in a staggered side-by-side arrangement with their longitudinal axes substantially

perpendicular to the direction of movement of the elevator member, wherein the improvements consist in:

said container having at least one longitudinal median partition which extends throughout the greater part of the length of the container and divides it internally into first and second housings for said cartridges, each said housing having a first longitudinal portion remote from said opening of the container for holding respectively two stacks of cartridges staggered by half a cartridge diameter, and a second longitudinal portion close to said opening and having a width which decreases gradually towards said opening to terminate with a width slightly greater than a cartridge diameter, said first and second portions of said first housing being connected at a zone which is staggered by half a cartridge diameter in the direction of the opening relative to the connecting zone between the corresponding portions of the said second housing;



said container having an end portion adjacent said opening, into which said second housing portions open, said end portion having a width which decreases gradually towards the opening, and

said elevator member being comprised of a single rigid body having first and second surfaces located in each housing on which the respective stacks of cartridges in said first and second housings rest, said first surface in each housing being staggered by half a cartridge diameter in the longitudinal direction of the container towards said opening relative to said second surface in each housing,

said housings each having internal guide ribs in said second portions and said end portion and said elevator member having complementary recesses on opposite sides thereof for receiving said ribs as said elevator rides so that said elevator may rise the full length of said magazine without undue frictional contact with the walls of said housings.

4,589,219

ADJUSTABLE CHEEKPIECE FOR GUNSTOCK

Keith Milliman, Fairport, N.Y., assignor to The Coleman Company, Inc., Wichita, Kans.

Filed Aug. 31, 1984, Ser. No. 646,313

Int. Cl.⁴ F41C *23/00*

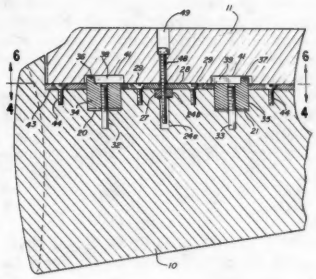
U.S. Cl. 42—73 **4 Claims**

1. In combination, a gunstock and an adjustable cheekpiece assembly, the gunstock having right and left sides, the cheekpiece assembly comprising:

a cheekpiece mounted on the gunstock, the cheekpiece having an elongated slot with a pair of side walls and a top wall,

a threaded stud mounted in a recess in the gunstock,

a cam positioned in said recess in the gunstock and threadedly engaged with the stud, the cam having an eccentric



pin mounted eccentrically with respect to the stud, the eccentric pin extending into said slot in the cheekpiece in being engageable by the side walls of the slot whereby the lateral position of the cheekpiece can be adjusted by rotating the cam, the eccentric pin being engageable with the top wall of the slot when the cam is screwed upwardly on the stud whereby the cheekpiece can be adjusted vertically.

4,589,220

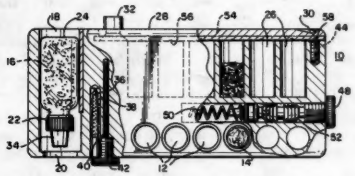
DEVICE FOR AIDING IN LOADING OF MUZZLE LOADING FIREARMS OF THE FLINTLOCK TYPE

James W. Lofland, 2275 Larkin Rd., Boothwyn, Pa. 19061

Filed Jul. 29, 1985, Ser. No. 759,672

Int. Cl.⁴ F41C *27/00*

U.S. Cl. 42—90 **13 Claims**



1. A self contained loading device and implement housing device, for use with flintlock type muzzle loading firearms comprising:

an elongated block, made of solid material, having a top face, a bottom face and a verticle dimension;

a plurality of sleeves bored through said block, each of said

sleeves having a diameter consistent with that of the caliber of a gun muzzle so as to be loaded and able to house a patched projectile sized for said caliber;

a plurality of cavities bored into one side of each block, each of such cavities of sufficient size to hold one premeasured charge of gun powder;

a means for covering said side cavities and for successively transferring said measured charges of gun powder, without ingredient loss, into a muzzle of a firearm;

a container, frictionally engaged in the body of the device, for holding and dispensing priming powder;

a plurality of holes drilled into the block, at various locations, for containing such devices or implements, but not limited to, a bullet puller, flash hole cleaner pick, patch puller, a ram rod jag, and a Vlier Ball Plunger;

retention means for keeping said bullet puller, flash hole cleaner pick, patch puller, and ram rod jag or other like implements, from falling out from the block when not in use.

4,589,221

FISHING LURE AND ENTRAPMENT DEVICE

Robert N. Mattison, 5826 McKinley Pl. North, Seattle, Wash. 98103

Filed May 4, 1984, Ser. No. 607,284
Int. Cl.[4] A01K *85/01*
U.S. Cl. 43—17.6 **6 Claims**

1. A fishing lure for housing an elongated chemiluminescent capsule having a resilient cylindrical outer surface and a predetermined length, comprising a translucent soft and flexible body having a body portion and a freely movable tail portion extending rearwardly therefrom, said body portion having an elongated substantially cylindrical cavity therewithin with a rearward closed end, said cavity having a length sized to receive and maintain the capsule substantially fully within said cavity, and having a width sized sufficiently small to frictionally engage outer surface of the capsule to firmly hold the capsule within said cavity, said body portion further including a sidewall defining said cavity having an elongated sidewall opening with a width smaller than the width of the capsule for insertion and removable therethrough of the capsule into and from said cavity, said opening having a width smaller than the width of the capsule, said sidewall having sidewall portions adjacent to and defining said opening with sufficient flexibility to be manually moved apart to permit passage of the capsule through said opening and with sufficient resiliency to return to their original position and assist in retaining the capsule in said cavity during normal usage of the fishing lure, said sidewall having at least a lengthwise portion with a sidewall thickness sufficient to be pierced by a hook for longitudinally threading a line attached to the hook therethrough for firm attachment of said body portion to the line.

4. A fishing lure using an elongated chemiluminescent capsule having a resilient outer surface and a predetermined length, comprising:

a rigid, elongated spoon-shaped body having a reflective surface on one face side of the body, the body including an aperture adjacent each end of the body for attachment of a fishing line, hook, or the like to the body; and

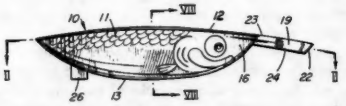
a pair of spaced-apart retainers fixedly attached to the body for removably securing the chemiluminescent capsule in substantial longitudinal alignment with the body intermediate the apertures on the side of the body with the reflective surface, the retainers having an opening sized to receive and hold the end portions of the capsule therein with the mid portion of the capsule extending between its end portions held in engagement against the face of the body, the retainers further having associated apertures extending transversely through the body to transmit light from the end portions of the capsule therethrough to the side of the body opposite the reflective surface, the frictional force between the capsule and the retainers and face of the body being sufficient to prevent endwise movement of the capsule during normal usage of the fishing lure, the retainers positioning the capsule to enable the light from the capsule to project back onto the reflective surface of the body and reflect outwardly therefrom.

4,589,222

FISH LURE

Gerald K. Barnhart, c/o 531 Quadra Street, Victoria, B.C., Canada (V8V 3S4)

Filed Nov. 10, 1981, Ser. No. 319,906
Claims priority, application Canada, Jul. 30, 1981, 382884
Int. Cl.[4] A01K *85/00*
U.S. Cl. 43—42.23 **5 Claims**



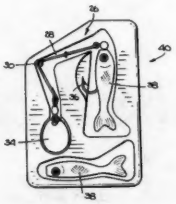
1. A fish lure in the general shape of a tail-less minnow having a main body of generally hydrodynamic shape including a head portion and a tail tip portion, said main body having, in side elevational view, a gently rounded upper back surface and an oppositely arcuately rounded lower belly surface and having, in top plan view, side faces which diverge from the head portion to a maximum body thickness and then converge to the tail tip portion; a projecting flat plate-like nose extending from the head in the form of a smooth continuous extension of the gently rounded upper back surface and extending downwardly less than the height of the body from the upper back surface to the lower belly surface, the nose having a shape, in top plan view, of forwardly diverging side faces which terminate in a transverse, connecting bevelled edge to provide two downwardly sloping side nose surfaces, the nose being provided with a plurality of spaced apart holes therethrough, disposed along the central longitudinal axis thereof for securing a fish line drawn through a selected said hole; a depending fin along the central longitudinal axis of the body, said fin being provided with a fish-line-guiding channel extending along an arcuate path longitudinally through it and along the body; whereby, in use, a side-to-side action is imparted to the fish lure along with an oscillation of the lure along its longitudinal axis.

4,589,223

FISHING LURE COMPOSITION

John D. Hastings, Mankato, Minn., assignor to Johnson Fishing, Inc., Mankato, Minn.

Filed Jul. 25, 1984, Ser. No. 634,169
Int. Cl.[4] A01K *85/00*
U.S. Cl. 43—42.24 10 Claims



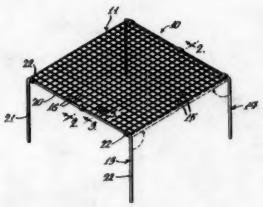
1. A fishing lure body comprising means for attracting fish visually and means for attracting fish by means of smell and taste wherein said means for attracting fish by means of smell and taste comprises a composition comprising from about 10% to about 50% by weight of an effective styrene-butadiene polymer; from about 40 to about 80% by weight of fish oil, having fish attracting properties; and an effective agricultural oil, selected from the group consisting of soybean oils and palm oils in an amount of an least about 10% based on the weight of said fish oil.

4,589,224

WIRE MAT TURF PROTECTOR

Dorothy A. Collette, 1040 Apple, Hoffman Estates, Ill. 60195

Filed Sep. 4, 1984, Ser. No. 646,799
Int. Cl.[4] A01G *1/04*
U.S. Cl. 47—1 R 2 Claims



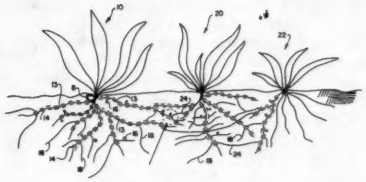
1. A repaired soil or turf supporting and protecting device, comprising; a rectangular rigid self supporting grid of wire cloth including a plurality of rigid parallel wires attached to a plurality of orthogonally disposed rigid parallel wires, said parallel wires being spaced approximately one-quarter to one-half inch apart to protect soil and turf surfaces and prevent animal access, while freely permitting turf regrowth, said wires all being equal guage and being unsupported by any surrounding support, said grid having a smooth upper surface to prevent injury to digging animals, said grid having a flat lower surface adapted to engage the upper surface of soil or turf, said grid having a thickness of less than 0.100 inches to prevent animal injury and permit lawn care equipment to pass freely thereover, and a plurality of U-shaped protruding elements permanently pivotally connected directly to the wires of this grid and extending orthogonally therefrom to attach the grid to the upper surface of the soil or turf, said attaching elements extending only from one side of grid said U-shaped protruding elements having a bight portion parallel to the wires to which they are connected.

4,589,225

PLANT FERTILIZATION USING A MICROBIOLOGICAL SYSTEM FOR PHOSPHORUS EXTRACTION AND DISTRIBUTION

Larry J. Stensaas, 130 S. 1300 East, Apt. 311, Salt Lake City, Utah 84101

Filed Mar. 11, 1983, Ser. No. 474,354
Int. Cl.[4] A01G *1/04*
U.S. Cl. 47—58 8 Claims



1. A method for producing microorganisms for use as soil inoculants comprising the steps of:

obtaining an environmentally controlled enclosure;

placing selected microorganisms within the enclosure;

placing at least one germinating host plant source within the enclosure in proximity to the selected microorganisms;

incubating the selected microorganisms and the germinating host plant source within the enclosure so that the selected microorganisms can infect at least one root developing from the host plant source; and

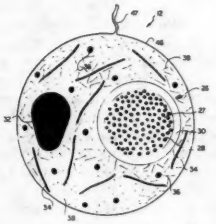
incorporating the infected host plant source with a source of phosphorus on a support means, to form an apparatus for delivering phosphorus to plants.

4,589,226

MICROBIOLOGICAL SYSTEMS FOR PHOSPHATE EXTRACTION AND DISTRIBUTION TO PLANT ROOT SYSTEMS

Larry J. Stensaas, 2460 Lynwood Dr., Salt Lake City, Utah 84109

Continuation of Ser. No. 294,681, Aug. 20, 1981, abandoned.
This application Aug. 13, 1984, Ser. No. 641,341
Int. Cl.[4] A01G *1/04;* C05F *11/08*
U.S. Cl. 47—58 69 Claims



1. A method of preparing microorganisms for use in plant inoculation comprising the steps of:

obtaining microorganisms suitable for encouraging plant growth;

propagating the microorganisms in association with host plants;

regulating chemical constituents which are available to the microorganisms and to their host plants so as to induce the microorganisms to leave a vegetative state of growth and to enter a state of natural dormancy, the regulating step comprising at least one of:

(a) promoting maturation of the host plants;

(b) harvesting leafy portions of the host plants; and
(c) modifying the growth conditions of the host plants; and

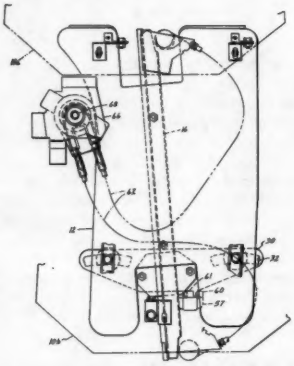
packaging the dormant microorganisms in proximity to a vector plant seed so as to ensure viability during storage and transportation and to permit their subsequent activation in association with the roots of a vector plant.

4,589,227

SIDE WINDOW GLASS REGULATOR FOR QUARTER WINDOWS ON CONVERTIBLES

David J. Bickerstaff, West Bloomfield, Mich., assignor to Ferro Manufacturing Corporation, Southfield, Mich.

Filed Apr. 26, 1984, Ser. No. 605,551
Int. Cl.⁴ E05F *11/52*
U.S. Cl. 49—227 **15 Claims**



1. A window regulator for an automotive vehicle having a window opening and a housing space beneath the opening and a window slot at the bottom of the opening through which a window glass is movable between a raised position in which it closes the opening and a lowered position in which it is substantially completely concealed in said housing space, a window glass shaped to conform to the window opening and movable through said window slot, generally vertical guide means connected to said window in said space curved to embody portions having components extending forward and rearward of the vehicle, said generally vertical guide means comprising a pair of guides fixed within said housing space, spaced longitudinally of the vehicle, and a pair of followers respectively associated with said guides fixed to said window adjacent the lower edge thereof, actuating means connected to said window adjacent its lower edge and movable generally vertically in said housing space and comprising means connecting said actuating means to said window to provide for relative movement between said window and said actuating means in a direction longitudinal of the vehicle as said window is raised and lowered, and drive means for moving said actuating means generally vertically to raise and lower said window.

4,589,228

HINGED DOOR FOR TV CONTROL PANEL

Ark Lachiw, Park Ridge, and Illia M. Stevanovich, Mt. Prospect, both of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.

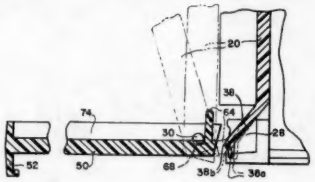
Filed May 8, 1985, Ser. No. 732,128
Int. Cl.⁴ E05F *1/10*
U.S. Cl. 49—386 **14 Claims**

1. An arrangement for pivotally coupling a door to a support panel comprising:

a pair of spaced mounting arms coupled to and extending from the support panel, each mounting arm including a respective mounting stud positioned along the length thereof and extending therefrom;

means defining a pair of spaced apertures in the door for receiving a respective mounting stud in pivotally coupling the door to the support panel;

tab means integral with and extending from the door; and



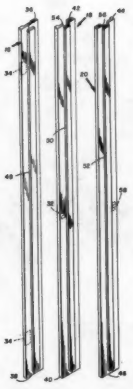
resilient cam means coupled to the support panel for engaging said tab means when the door is in a partially closed position for urging the door to and maintaining the door in a fully closed position, wherein said tab means and said resilient cam means are disengaged when the door is in a fully open position.

4,589,229

ADJUSTABLE DOOR JAMB ASSEMBLY

Lawrence L. Warren, 6586 Fruitgift Pl., Columbia, Md. 21045

Filed Jan. 7, 1981, Ser. No. 223,145
Int. Cl.⁴ E06B *1/04*
U.S. Cl. 49—505 **14 Claims**



1. A door jamb assembly for varied installations in a rough cut door opening in a wall comprising in combination:

a first elongated member for mounting on one side of said rough cut door opening, said first member including a facing portion and a door stop portion positioned at an outer surface of said first member when mounted, said first member having a first end and a second end; and

second and third elongated members for mounting on the other side and top of said door opening, said second and third elongated members each having first and second ends and comprising a facing portion and a door stop portion positioned on an outer surface thereof when mounted,

said facing portions of said first, second, and third elongated members being variable in width for mounting in door openings cut in walls of different thicknesses, said first, second, and third elongated members each comprising an elongated base section and an elongated movable section,

each of said elongated movable sections being movable in relation to the associated said base section to vary the width of said first, second, and third elongated members, a portion of each of said movable sections being captured and slidably retained by a capturing portion of the associated said base sections, sliding of said movable sections within the associated base sections permitting the varying in width of said first, second, and third elongated members, said capturing portion of each of said base sections comprising a longitudinally disposed groove in a longitudinal edge thereof, each of said movable portions comprising a pair of parallel longitudinal tongues of different widths joined by a longitudinal bight portion, either of said tongues being capturable within said groove, capturing of the wider of said tongues providing a facing portion of a width wider than the facing portion provided when the narrower of said tongues is captured by said groove,

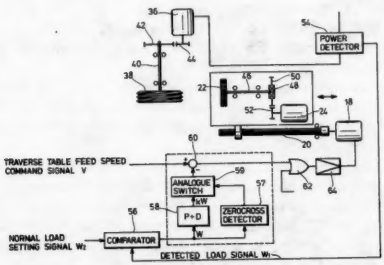
said second member for mounting on the top of said door opening when said third member is mounted on said other side of said door opening, said first end of said second member for mating with said first end of said first member, said first end of said third member for selectively mating with a portion of said second member anywhere intermediate said first and second ends thereof,

said third member for mounting on the top of said door opening when said second member is mounted on said other side of said door opening, said second end of said third member for mating with said second end of said first member, said first end of said second member for selectively mating with a portion of said third member anywhere intermediate said first and second ends thereof.

4,589,230
GRINDING MACHINE

Shigehiro Yonemura; Hiroshi Umino, both of Sayama; Masao Kume, Tokyo; Mitsuo Abe, Kiyose, and Satoshi Miyatake, Kawagoe, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 6, 1984, Ser. No. 647,815
Claims priority, application Japan, Sep. 9, 1983, 58-166117
Int. Cl.[4] B24B *19/00*
U.S. Cl. 51—95 GH **8 Claims**



1. A grinding machine comprising:

(a) a first rotational drive source for rotating a grinding tool;

(b) a second rotational drive source for rotating a workpiece to be ground by said grinding tool;

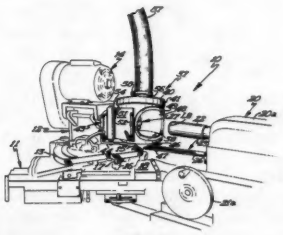
(c) means for displacing said grinding tool and said workpiece with respect to each other; and

(d) a control unit controlling said displacing means according to change of a load imposed on said first rotational drive source wherein said control unit includes a power detector connected to said first rotational drive source for detecting the load on said first rotational drive source, a comparator connected to an output terminal of said power detector for comparing an output load signal from said power detector and a normal load setting signal, and an adder for adding an output signal from said comparator and a command signal for displacing speed of said displacing means and an output terminal of said comparator is connected to a proportional-plus-derivative control circuit, a zero crossing detector and an analog switch, said zero crossing detector selectively opening and closing said analog switch in response to the output signal from said proportional-plus-derivative control circuit to said adder for controlling said second rotational drive source.

4,589,231
APPARATUS AND PROCESS FOR DRY CUTTING OF PLASTIC OPTICAL LENSES

Tiner E. Roberts, St. Stephen, Minn., assignor to Flo-Bob Industries Inc., St. Cloud, Minn.

Filed Jan. 24, 1985, Ser. No. 694,445
Int. Cl.[4] B24B *7/00*
U.S. Cl. 51—124 L **6 Claims**



1. A lens generating apparatus for generating lenses made from plastic in a dry operation without the use of a liquid coolant including a base, a lens blank holder having a plastic lens blank to be generated thereon and being extensible and retractible relative to the base, and for shifting the same in an extensible and retractible direction relative to the base, a revolvable tool holder being revolvable and laterally oscillatable relative to the base, means for revolving the tool holder, and means for laterally oscillating the tool holder relative to the base,

a multiple grit-plated diamond tool mounted on said tool holder for rotation therewith and engaging the lens blank during the lens generating operation to remove material from the blank,

a chamber structure, including a top wall, a bottom wall, a vertical peripheral wall, a pair of openings in the peripheral wall of the chamber structure, the tool holder and grit-plated diamond tool projecting through one of the openings in the peripheral wall and the lens blank holder projecting through the other opening in the peripheral wall during lens generation, said other opening having a cross-sectional area substantially larger than the cross-sectional area of the lens blank holder so that a relatively large unobstructed zone around the lens blank holder is defined by said other opening, said chamber structure having an opening in the top wall thereof located above the tool and lens blank when the tool and blank are disposed in engaging relation with each other,

an elongate vacuum conduit having one end thereof connected to the opening in the top wall of the chamber structure in communicating relation with the interior of the latter adjacent the other opening in the peripheral wall thereof, and having its other end connected to a power driven vacuum fan device so that operation of the vacuum fan device during the lens generating operation produces high volume, high velocity ambient air flow through the other opening in the peripheral wall and the cut swarf material produced in the lens grinding operation will be entrained in the stream of air and evacuated through the vacuum conduit.

4,589,232

MOUNTING FOR ROTARY GRINDING AND DRESSING TOOLS

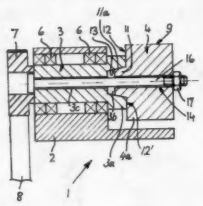
Uwe Uhlig, Buchholz, Fed. Rep. of Germany, assignor to Hauni-Werke Körber & Co. KG, Hamburg, Fed. Rep. of Germany

Filed Jun. 7, 1984, Ser. No. 618,216

Claims priority, application Fed. Rep. of Germany, Jun. 9, 1983, 3320811; Jul. 2, 1983, 3323928

Int. Cl.[4] B24B *45/00*

U.S. Cl. 51—168 19 Claims



1. In a machine tool, particularly in a grinding machine, the combination of a rotary supporting member having an end portion; a rotary material removing member having an end portion, one of said end portions having a recess and a conical internal surface in said recess and the other of said end portions including a projection having a conical external surface complementary to said internal surface, the maximum diameter of said external surface exceeding the maximum diameter of said internal surface and the length of said projection being less than the maximum diameter of said external surface, said surfaces being coaxial with the respective members and said projection constituting a relatively short conical frustum and being received in said recess so that said surfaces abut against one another, said members further having end faces which abut against each other when said surfaces abut against one another, the maximum-diameter portions of said surfaces being closely adjacent to the respective end faces, as considered in the axial direction of the respective members; and means for releasably holding said end faces in contact with one another.

4,589,233

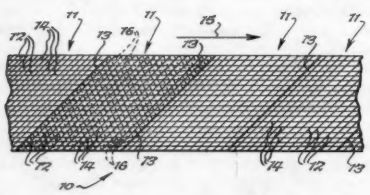
SECTIONAL ABRASIVE BELT

Dhan N. Parekh, Williamsville, and David E. Williams, North Tonawanda, both of N.Y., assignors to Carborundum Abrasives Company, Niagara Falls, N.Y.

Filed Jun. 25, 1984, Ser. No. 623,956

Int. Cl.[4] B24D *11/02, 11/06*

U.S. Cl. 51—399 14 Claims



1. A sectional cloth backed abrasive belt having a running direction, comprised of a series of abrasive coated cloth backed sections, said sections joined together at angles between about 45° and about 85° to said running direction, the cloth backing of said sections having warp filaments and fill filaments, at least a portion of said fill filaments in said cloth backing positioned at an angle of from 45° to 85° to said warp filaments, said sections being joined such that at least 30% of said fill filaments in said cloth backing are disposed in the running direction of the belt.

4,589,234

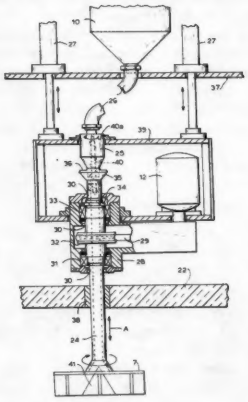
ARTICLE-TREATING APPARATUS

Dieter Rebhan, Gelting, and Hartmut Krümpholz, Würzburg, both of Fed. Rep. of Germany, assignors to Linde Aktiengesellschaft, Wiesbaden, Fed. Rep. of Germany

Filed Mar. 30, 1984, Ser. No. 595,265

Int. Cl.[4] B24C *3/14*

U.S. Cl. 51—417 9 Claims



1. An apparatus for the surface treatment of workpieces with a granular blast medium, comprising:

a housing forming a treatment chamber;

transport means for entraining workpieces to be treated through said housing;

means for connecting said workpieces with a deep-cooling fluid to embrittle at least surface portions of said workpieces to render them susceptible to removable by contact with said blast medium;

a sling wheel in said chamber positioned upon rotation to cast said blast medium against said workpieces;

a hollow shaft carrying said sling wheel and provided with means for the cantilever journaling thereon with respect to said housing whereby said sling wheel is mounted at a free end of said hollow shaft;

a nonrotatable tube extending into said hollow shaft for feeding said blast medium therethrough to said sling wheel; and

a feed bin connected with said nonrotatable tube for supplying said blast medium thereto, said sling wheel lying in a substantially horizontal plane and is rotatable on said hollow shaft about a substantially vertical axis, said workpieces being carried along a substantially horizontal path around said sling wheel; and

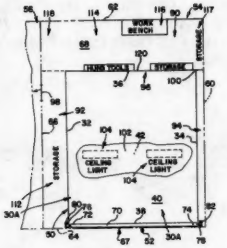
means for vertically oscillating said sling wheel and said hollow shaft relative to said path, said bin being vertically fixed and being provided with a fixed pipe communicating with said hollow shaft during the vertical oscillation thereof, said fixed pipe extending into said tube and said tube being vertically oscillated with said hollow shaft.

4,589,235

PANEL PARTITION ARRANGEMENT FOR RECREATION CHAMBER FORMATION IN DOMESTIC GARAGES

Paul S. Anderson, 227 S. Orr Dr., Normal, Ill. 61761

Filed Mar. 12, 1984, Ser. No. 588,447
Int. Cl.[4] E04H *6/00*; A63B *71/04*
U.S. Cl. 52—28 **7 Claims**



1. In a family garage that forms a generally quadrilateral housing for one or more parked automobiles, which housing includes a vertical front wall defining the garage door opening, a sectionalized overhead door movably mounted to optionally close the doorway when in its lower vertically disposed position and optionally effect opening of the doorway for access into the garage through such doorway when moved to an overhead position within the housing, a vertical rear wall opposing the vertical front wall, and opposed vertical side walls extending between the front and rear walls to either side of the door opening, a generally flat floor, and a roof overlying the floor and sheltering the garage space defined by said walls, the improvement comprising:

a panel partition arrangement for defining a recreation chamber within the garage housing including a first vertical wall structure paralleling and substantially coextensive with a predetermined length of one of the garage side walls,

said partition arrangement first wall structure being mounted in place and defining flush wall surfacing along the interior of said chamber on one side thereof forming a first playing surfacing of said chamber,

said door comprising a plurality of panels articulated together in side by side relation and shiftably mounted adjacent their ends for said optional movement between the doorway closed position and the doorway open position,

said door panels each having affixed thereto a continuous facing sheet of quardrilateral configuration having a facing surface facing inwardly of the garage,

with said facing sheets being proportioned lengthwise and widthwise thereof such that in the doorway closing position of the door, said facing surfaces thereof are disposed in flush coplanar relation across the width of the door and are closely spaced vertically for forming a second playing surfacing of said chamber within said chamber,

said partition arrangement including a second vertical wall structure mounted in place opposing said first vertical wall structure and coextensive therewith and defining flush wall surfacing along the interior of said chamber on the other side of said chamber and forming a third playing surfacing of said chamber that opposes said first playing surfacing,

said vertical wall structures being side wall structures disposed on either side of the garage space that respectively parallel and are substantially coextensive with the respective side walls of the garage that are adjacent the overhead door,

with the floor for said predetermined length of said one garage sidewall being obstruction free for defining a fourth playing surfacing of said chamber,

said partition arrangement further including a generally flat and vertical rear wall structure comprising a framework hinged in place to swing about a vertical axis between a first position in which it extends substantially normally of and between said first and second vertical wall structures, and a second position in which it substantially abuts one of said first and second vertical wall structures, in overlying relation to said playing surfacing thereof,

said rear wall structure including latch means for securing said framework in said first position,

said rear wall structure framework including flush wall surfacing on one side thereof for comprising the interior of said chamber in said first position thereof and forming a fifth playing surfacing thereof,

said rear wall structure framework including storage means including means for removably mounting tools on the other side of same for exposure to the garage doorway when said rear wall structure framework is in said second position thereof,

said vertical axis being adjacent said one of said side wall structures, and is at one end of said hinged framework,

whereby, when the garage is to serve as such, said rear wall structure is moved about said axis to said second position thereof to expose said other side thereof in the garage space along said second vertical wall structure and mask said third and fifth playing surfacings, and the door is disposed in its overhead position for automobile access into the garage through the garage doorway and is disposed in its lower position for enclosing the automobile therein,

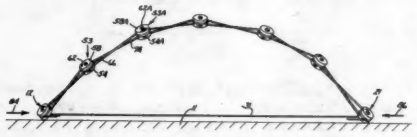
and when the garage is to provide said recreation chamber within the garage when the garage is automobile free, said rear wall structure is moved about said axis to said first position to partially complete said recreation chamber and expose within same both said third and fifth playing surfacings, and the door is disposed in its lower vertically disposed position to complete the perimeter of said chamber and to form said second playing surfacing within said chamber.

4,589,236

GEOMETRIC FRAME ASSEMBLY

Jack G. McAllister, 805 Montrose Blvd., Buffalo, Minn. 55313

Filed Jun. 5, 1984, Ser. No. 617,318
Int. Cl.[4] E04B *1/32*
U.S. Cl. 52—81 **29 Claims**



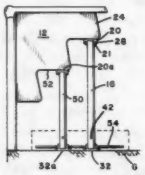
1. A frame assembly located over a surface comprising: a plurality of hub assemblies arranged in a generally triangular pattern over the surface, each of said hub assemblies having a first member and a second member, means rotatably mounting the first and second members to allow the first and second members to rotate independently of each other, a plurality of flexible struts connected to adjacent hub assemblies, said struts including first struts connected to the first member of one hub assembly along chord lines of the first member and to the second member of another hub assembly along chord lines of the second member, and means cooperating with the hub assemblies, including cable means engageable with the hub assemblies located around the outer perimeter of the frame assembly to hold the hub assemblies and struts in an erected position over the surface.

4,589,237

STAIR MODULE SUPPORT AND LEVELING CONSTRUCTION

Donald E. Dahowski, York, Pa., assignor to Quaker Plastic Corporation, Mountville, Pa.

Filed May 1, 1984, Ser. No. 606,081
Int. Cl.[3] E04F *11/00;* E04H *3/16*
U.S. Cl. 52—169.7 16 Claims



1. A support for securing in place on a substrate a preformed one piece stair module comprising:

(A) a support pad secured at the underside of a step of the stair module, said pad having a flat base portion and being provided with a depending extension;

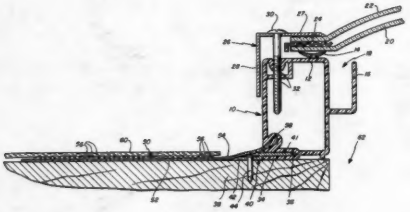
(B) a vertical support post having its top positioned in said depending extension and connected to said pad through said depending extension; and wherein the top of the vertical support post is underneath and spaced from and is connected to said pad so that the top of the post is spaced from the base of the pad.

4,589,238

SKYLIGHT SEALING

Robert C. Sampson, Sanford, and Sean T. Flanigan, Wells, both of Me., assignors to Wasco Products, Inc., Sanford, Me.

Filed Jun. 27, 1985, Ser. No. 749,947
Int. Cl.[4] E04B *7/18*
U.S. Cl. 52—200 12 Claims



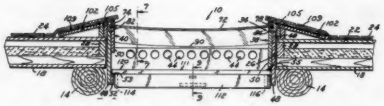
12. In a skylight for covering an opening in a building having a rigid curb frame with means associated therewith for supporting a cover means, in combination, a means for securing the curb frame to the building, a flexible flashing flange extending from the base of the curb frame and disposed about the periphery of the curb frame, said flashing flange having a plurality of elongated spaced upstanding ribs that form flow diverters extending peripherally about the curb frame, said flexible flashing flange being co-extruded with said curb frame with a flexible flashing flange being of a more flexible material in comparison with the rigid curb frame, said co-extruded flexible flashing flange being wider than the curb frame, said means for securing the curb frame to the building comprising clip means, said curb frame having a base slot for receiving a portion of said clip means, said clip means having one end that is adapted to be received by said slot and a second end that is a hole for receiving a nail or the like fastener, wherein one end of said flange is supported at said curb frame base but disposed over said curb frame base slot, the width of said flashing flange being on the order of 6" and the ribs being spaced on the order of ¼" apart, shingle means over the flashing flange, said shingle means adapted to be secured to the building, but only outside of the flashing flange, and a glazing gasket on the curb frame, wherein said glazing gasket and flexible flashing flange are both co-extruded with the rigid curb frame.

4,589,239

SKYLIGHT ASSEMBLY

Peter A. Cummings, 655 Pine St., Harbor Springs, Mich. 49740

Filed Apr. 30, 1985, Ser. No. 728,842
Int. Cl.[4] E04D *13/03;* E04B *7/18*
U.S. Cl. 52—200 14 Claims



1. A skylight assembly for a sloping roof comprising in combination:

a rectangular casing having a header, side and bottom rails, to be received in a complementary-shaped hole in a roof;

a translucent outside skylight panel mounted in said casing and bridging the space between the rails and extending over and beyond the bottom rail; and

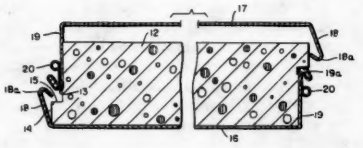
means on said casing for supporting the panel beneath the roof covering along the header and side rails while supporting the panel to overhang the roof covering along the bottom rail.

4,589,240

FOAM CORE PANEL WITH INTERLOCKING SKINS AND THERMAL BREAK

William F. Kendall, Oregon; Richard A. Smith, and William Wadsworth, both of Dixon, all of Ill., assignors to Raynor Manufacturing Company, Dixon, Ill.

Filed Sep. 19, 1984, Ser. No. 651,936
Int. Cl.[4] E04B *2/28*
U.S. Cl. 52—309.11 10 Claims



1. A panel comprising a planar core of generally rectangular configuration formed of resilient polymeric foam and having its opposite faces engaged and covered by a pair of flat, rectangular skins formed of rigid sheet material; each skin having a pair of inturned flanges extending at generally right angles to the plane of such skin along opposite longitudinal edges thereof; said flanges of the respective skin being provided with hook portions reversely turned with respect to each of such flanges and interlocking said skins together with said foam core therebetween; each hook portion of one skin interlocking with a hook portion of the other skin to prevent separation of said skins apart; whereby, unhooking of said interlocking hook portions would require movement of said skins towards each other with resultant planar compression of said core, and such unhooking action is therefore opposed and resisted by said core; and elongated thermal barrier members of resilient, flexible material interposed between the interlocking hook portions

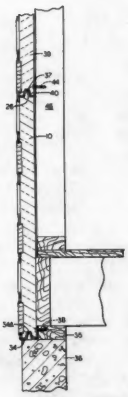
of said skins along each of the longitudinal edges of said panel to prevent direct contact between said skins; at least one of said thermal barrier members having an elongated, integral, and deformable bead portion disposed externally of the interlocking hook portions of said flanges to provide a resilient cushion for sealingly engaging a similar bead portion of a second panel disposed adjacent to said first-mentioned panel.

4,589,241

WALL CONSTRUCTION

Carl X. Volpenhein, Covington, Ky., assignor to American Siding Discount Distributor, Inc., Cincinnati, Ohio

Filed Sep. 29, 1983, Ser. No. 537,286
Int. Cl.⁴ E04F *13/08*
U.S. Cl. 52—315 **12 Claims**



1. A building construction for erecting a wall, comprising:

(a) a wall panel member of foamed polystyrene material, said wall panel member including first and second substantially planar faces adapted for vertical disposition, said faces extending horizontally in parallel relationship between a pair of opposite end surfaces and extending vertically between top and bottom surfaces;

(b) means for securing the second planar surface of the panel member onto a building structure in an upright position with the first and second planar surfaces being in substantially parallel planes; and

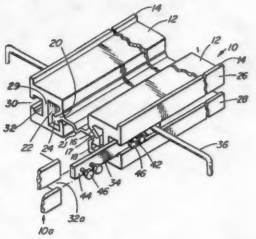
(c) a plurality of vertically and horizontally spaced and aligned cavities extending into the panel member for receiving a plurality of facing components, each of such cavities including at least one inwardly extending ridge deformable under the insertion force of a facing component so as to provide a friction fit for facing components of varying dimension, said cavities being spaced over substantially the entire vertical and horizontal expanse of the panel member, each of the cavities being open to the first planar surface and having top and bottom sides in substantially parallel relationship to each other and with the top and bottom surfaces of the panel member, the end surfaces of each of the cavities being in substantially parallel relationship to each other and to the end surfaces of the panel member.

4,589,242

JOINING ELEMENT

Raoul M. Moulinié, Lachenaie, and Guy Gagné, St. Sauveur des Montes, both of Canada, assignors to Z-Tech Enterprises Inc., Quebec, Canada

Filed May 15, 1984, Ser. No. 610,608
Int. Cl.⁴ E04B *1/68;* E04F *15/14*
U.S. Cl. 52—396 **10 Claims**



1. A joint assembly for receiving a recessed type joining seal comprising a pair of spaced apart one-piece joining elements of extruded material with a sealing element therebetween, each joining element having a rectangularly shaped body in cross section formed of a top, elongated, horizontally extending planar supporting wall, an opposed parallel coextensive planar bottom wall, a first interior vertical front side wall extending between said top and bottom walls, said front side wall having an upper wall section extending downwardly and slanting inwardly from said top wall, and a spaced apart lower wall section extending upwardly from said bottom wall, and a second generally coextensive vertical rear side wall opposed to said first side wall and having an upper edge portion extending above said top wall forming a rear abutment edge for said top wall, said second side wall having a substantially planar upper wall section and a spaced apart substantially planar lower wall section, an elongated longitudinally extending aperture in each of said front and rear side walls intermediate said top and bottom walls, a first chamber in said front side wall adapted to receive a portion of a sealing member, said elongated longitudinally extending aperture in said front side wall forming a restricted mouth with said first chamber and being in communication with said first chamber in said front side wall, and a second chamber in said rear side wall adapted to receive a joinder member in engaging relationship therewith, said elongated longitudinally extending aperture in said rear side wall forming a restricted mouth with said second chamber and being in communication with said second chamber, and a sealing element extending between said opposed joining elements mounted beneath the top walls of said joining elements, said sealing element comprising opposed end members for insertion in said elongated longitudinally extending aperture in said front side wall.

4,589,243

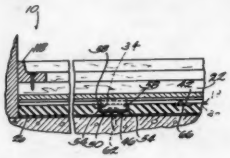
FLOORING SYSTEM WITH STRIP OF RESILIENT MATERIAL IN COMPRESSION

Carl W. Abendroth, 210 Crystal Ave., Crystal Falls, Wis. 49920

Continuation-in-part of Ser. No. 387,184, Jun. 10, 1982, Pat. No. 4,449,342. This application May 9, 1984, Ser. No. 608,389
Int. Cl.⁴ E04B *1/62*
U.S. Cl. 52—403 **21 Claims**

1. A flooring system comprising a foundation, an underlayment on said foundation, said underlayment being fabricated of a first material and including a plurality of spaced-apart parallel grooves, a plurality of support members in said grooves, a plurality of floorboards superposed on said support members and said underlayment, a plurality of strips of resilient material fabricated of a second material different from said first material and located between said floorboards and said underlayment

and between said grooves, and means for fastening said floorboards to said support members so that said strips of resilient



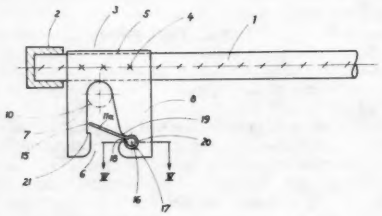
material are in compression between said floorboards and said underlayment.

4,589,244

SPACER FOR REINFORCEMENT MATS

Selma Dreizler, Ringstr. 81, 7066 Baltmannsweiler 2, Fed. Rep. of Germany

Filed Apr. 7, 1983, Ser. No. 483,056
Int. Cl.[4] E04C *5/16*
U.S. Cl. 52—685 **25 Claims**



1. A spacer adapted for use with two reinforcement mats of a framework, each of said mats being made of an array of reinforcement bars defining a vertical plane, said spacer comprising

a spacer bar adapted to be positioned perpendicularly to said two reinforcement mats,

at least one substantially flat U-shaped clamp having a base secured coplanarly to said spacer bar, having two legs and an opening defined between said two legs, said opening extending from said base to free ends of said legs,

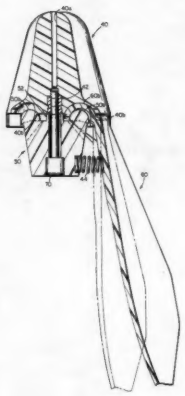
spring means secured at one end thereof to one of said legs and extending into the opening so as to close the opening in a normal position of the spring means, said spring means for being elastically moveable so as to open said opening permitting one of said reinforcement bars to enter said opening upon pressing of an intermediate portion of said one reinforcement bar against said spring means in a direction towards said base such that said spring means deflects and said one reinforcement bar passes said spring means into said opening, said spring means further for returning back into said normal position closing said opening after said one reinforcement bar passes said spring means into said opening such that said clamp is held undetachably on said one reinforcement bar.

4,589,245

FINGER ASSEMBLY FOR CASE LOADER

Kenneth E. Kroeber, East Haddam, and H. Steven Kayser, Middletown, both of Conn., assignors to Standard-Knapp, Inc., Portland, Conn.

Continuation-in-part of Ser. No. 558,497, Dec. 6, 1983, abandoned. This application Aug. 17, 1984, Ser. No. 642,335
Int. Cl.[4] B65B *39/02*
U.S. Cl. 53—248 **20 Claims**



1. A finger assembly for a case loader comprising a finger holder defining a vertical central axis, means mounting said holder on the loader, a finger retaining member, means for releasably clamping said retaining member to said holder, said holder and retaining member disposed axially one above the other and cooperating with one another to define abutment surfaces to locate said retaining member in axially clamped relationship to said holder, said holder and retaining member also cooperating to define a plurality of circumaxially spaced finger sockets therebetween, each socket having a generally spherical bearing surface, a plurality of downwardly projecting circumaxially spaced fingers, each of which fingers includes an upper end of generally complementary spherical shape adapted to bear upon said spherical socket surface, said finger being movable pivotably in said socket toward and away from the axis of said holder and retaining member, said socket being so shaped spherically that said finger is also movable from side-to-side relative to such movement toward and away from said axis, and finger biasing means acting on said fingers to urge said fingers away from said axis.

4,589,246

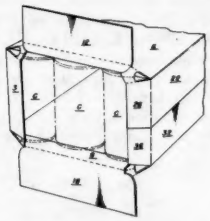
METHOD OF CLOSING AN END LOADING CARTON

Prentice J. Wood, Hapeville, Ga., assignor to The Mead Corporation, Dayton, Ohio

Filed Jan. 28, 1985, Ser. No. 695,261
Int. Cl.[4] B65B *7/22*
U.S. Cl. 53—491 **3 Claims**

1. A method of closing the ends of an end loading tubular can carton having end flaps foldably joined to each end edge of the top and bottom walls and to a projecting end portion of the side walls and having collapsible web structure foldably joined to the end edges respectively of the end flaps foldably joined to each end of the top and bottom walls and to the adjacent projecting end portion of the side walls, the method comprising the steps of folding the projecting end portions of each side wall in a direction away from the associated end of the carton so as to cause the end flaps associated with the top and bottom walls to swing inwardly, folding the end flaps associated with the side walls inwardly and toward the adjacent ends of the

carton during collapse of the web structures and to position the web structures in overlying relation relative to the ends of the adjacent cans, folding the end flaps which are associated with



the side walls inwardly and into overlapping relation with each other at each end of the carton, and securing said overlapping ends together.

4,589,247

APPARATUS FOR PREVENTING CREASES IN TRANSVERSE SEALING

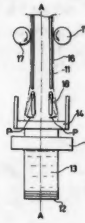
Orihiro Tsuruta; Yasuo Oki, and Yasugi Zinbo, all of Tomioka, Japan, assignors to Orihiro Co., Ltd., Japan

Filed Sep. 12, 1984, Ser. No. 649,894

Claims priority, application Japan, Mar. 27, 1984, 59-42725[U]

Int. Cl.⁴ B65B *9/08, 61/00*

U.S. Cl. 53—550 **3 Claims**



1. An apparatus for preventing creases in a transverse seal and for a packing machine, comprising feed roller means for lowering a film tube, a pair of squeeze rollers rotatable about transverse axes disposed below said feed roller means for separating a product fed in the bottom of the film tube into a specified amount for one pack, said squeeze rollers being mounted for movement transversely to said transverse axes, toward the film tube to hold the film tube, transverse sealing means for transversely sealing the film tube along a direction parallel to said transverse axis, a pair of butterfly arms provided inside the film tube and mounted for movement between open and closed positions in a direction parallel to said transverse axes of said squeeze rolls, and drive means connected to said butterfly arms for spreading said arms into their open position to stretch the film tube in the direction parallel to the transverse axes before the film tube is held by said squeeze rollers.

4,589,248

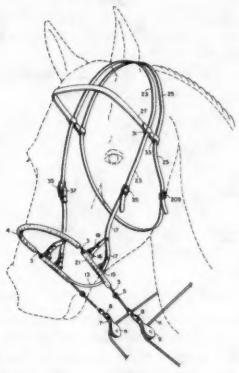
HORSE TRAINING HALTER

by William U. Ruddock, administrator, P.O. Box 45, Hwy. 90A, Gonzales, Tex. 78629, and Henry C. Weston, deceased, late of Gonzales, Tex.

Filed Aug. 1, 1984, Ser. No. 636,622

Int. Cl.⁴ B68B *1/02*

U.S. Cl. 54—24 **8 Claims**



1. An apparatus for training and reducing the effort required to control the movement of a horse comprising:

a cable and cover, said cable being movable within said cover;

means passing over the horse's head for retaining said cable on the nose of the horse; said cable retaining means including a cover means slidably mounted on said cable

said cable being slidably connected to a means for pulling said cable through both said said cover and said cover means such that the head of said horse is forced towards the ground when said cable pulling means is pulled by the rider of said horse; and

means for anchoring said cable pulling means to said horse.

4,589,249

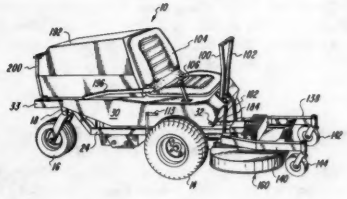
MOWING APPARATUS

Wesley M. Walker; Robert W. Walker, and Dean M. Walker, all of Loveland, Colo., assignors to Walker Manufacturing Company, Fort Collins, Colo.

Filed Dec. 15, 1980, Ser. No. 216,149

Int. Cl.⁴ A01D *61/02, 53/04*

U.S. Cl. 56—16.6 **14 Claims**



1. A mower comprising:

a vehicle controllably powered to be steerably moved over an area to be mowed;

a cutter assembly mounted on said vehicle for mowing;

a hopper mounted on said vehicle;

means including a conduit for delivering mowed cuttings from said cutter to said hopper;

means for mounting said hopper atop said vehicle in a position in which said hopper is coupled to the delivery end of said conduit;

and included in said mounting means for moving said hopper with respect to said vehicle into another position in which said hopper is disengaged from said conduit.

4,589,250

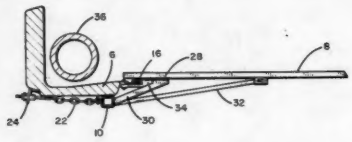
SUNFLOWER HEADER ATTACHMENT FOR COMBINE

Albert Faul, Jr., Harvey, N. Dak., assignor to Faul Manufacturing, Inc., Harvey, N. Dak.

Filed Dec. 4, 1984, Ser. No. 678,169

Int. Cl.[4] A01D *45/30*

U.S. Cl. 56—126 **5 Claims**



1. Apparatus for converting a combine over to the harvesting of sunflowers, comprising in combination:

(a) an elongated rigid frame member detachably mountable to the bottom of a combine header platform;

(b) a plurality of sunflower pan support platforms attached in spaced apart relation to one another along said frame member, wherein each sunflower pan support platform is supported by a pair of brace members upwardly radiating from said frame member and having at least one cross brace therebetween to the bottom of said platform, and wherein each of said sunflower pan support platforms is mounted to said frame member so as to mount in overlying relation to a reciprocating knife assembly at the front-end of said combine;

(c) a plurality of tab members, each attached to said frame member for securing one end of a brace member from a sunflower pan thereto; and

(d) a plurality of draw fastener assemblies mounted in spaced-apart relation to one another along said frame member, each of said assemblies comprising;

(1) a length of chain secured at one end to said frame member and secured at an opposite end to a threaded member,

(2) a clamp slidably mounted along said threaded member and mountable in a mating recess at said header platform,

(3) a plurality of stop members fixedly mounted to the bottom of said header platform, and

(4) means cooperating with said threaded member for urging said clamp against said header platform and said frame member against said stop members, whereby said apparatus is detachably fixedly secured to the header platform of said combine.

4,589,251

GRASS BAG ATTACHMENT FOR COMBINATION LAWN MOWER AND TRACTOR

Akira Amano, Tokyo, and Kazuhiko Sasaki, Saitama, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 3, 1984, Ser. No. 677,450

Claims priority, application Japan, Dec. 2, 1983, 58-186757[U]

Int. Cl.[4] A01D *34/12*

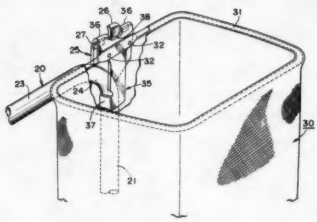
U.S. Cl. 56—202 **4 Claims**

1. A grass bag attachment for accepting a pair of grass bags for a lawn mower mounted on and disposed below a tractor having a chassis, said grass bag attachment comprising:

(a) a pair of spaced brackets adapted to be mounted on a rear end of the chassis;

(b) a support post composed of a pair of spaced, substantially vertical portions and a cross portion joining said vertical portions at upper ends thereof, said vertical portions having respective lower ends detachably connected to said brackets, respectively, by pins; and

(c) a pair of grass bags having front central portions supported on said support post, wherein said grass bags include hook members mounted on said front central portions thereof in order to keep each grass bag in balance transversely, said support post having support brackets



mounted respectively on front surfaces thereof and spaced from each other along said cross portion at the upper ends of the vertical portions, respectively, of the support post, said grass bags being supported on said support post with said hook members held in hooking engagement with said support brackets, and wherein each of said support brackets is in the form of a substantially flat plate, said support brackets being attached to said support post and lying in a plane parallel to said cross portion, each of said support brackets having a portion projecting upwardly beyond said support post and including a central tongue and a pair of steps disposed one on each side of said central tongue and lower than the central tongue.

4,589,252

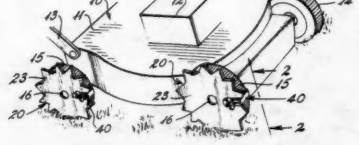
STEEP TERRAIN STABILIZING DEVICES FOR LAWN MOWERS

Will T. Williams, No. 6 Boundbrook Dr., Paris, Tenn. 38242

Filed Sep. 17, 1984, Ser. No. 651,021

Int. Cl.[4] A01D *75/28*; B60B *15/00*

U.S. Cl. 56—255 **6 Claims**



1. Safety apparatus for attachment to a vehicle's wheels to prevent lateral skidding when traversing sloped terrain which comprises:

disc means having a main body portion adapted to bear against the vertical side of one of the vehicle's wheels and rotate therewith;

a plurality of ground penetrating teeth means extending outwardly from said main portion having outermost points which extend substantially equal distances from the periphery of the vehicle's wheel on which said disc means is to be mounted, said outermost points being spaced sufficiently close together around said main portion's periphery to ensure that at least two of said teeth means

continuously engage underlying sod when mounted on said wheel; and

readily removable adjustable mounting means for securing said disc means in firm engagement with the lateral side of said wheel so that said body position is substantially centered with the wheel's axis of rotation, said mounting means comprising two separated hook-shaped bracket means which are rigidly attached to and extend normally from said disc means and are formed to grip the tread of the vehicle's wheel on which they are to be mounted and a clamp means which is also formed to receive and grip the vehicle's wheel on which it is to be mounted, said clamp means selectively movably secured to said main body portion of said disc means in a locking engagement whereby both said bracket means and said clamp means are urged against the tread of the vehicle's wheel on which said disc means is to be mounted.

4,589,253

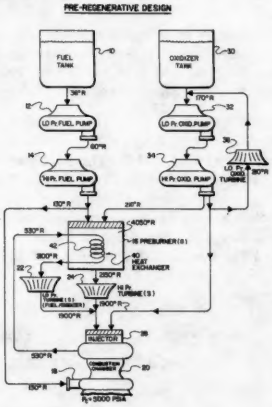
PRE-REGENERATED STAGED-COMBUSTION ROCKET ENGINE

William R. Wagner, Los Angeles, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Apr. 16, 1984, Ser. No. 600,851

Int. Cl.[4] F02K *9/48*

U.S. Cl. 60—204 **7 Claims**



1. A method for increasing the power and thrust output of a staged-combustion rocket engine, said engine having a preburner which receives a portion of an output flow of fuel from a fuel tank, said preburner having an output flow for providing a source of energy for a high-pressure turbine of a high-pressure turbopump the output flow of said high-pressure turbine combining with the output flow of a low-pressure turbine of a low-pressure turbopump, said low-pressure turbine receiving the output flow of the cooling jacket of an engine combustion chamber, said cooling jacket having received another portion of the flow from said fuel tank, said combined flow from said high-pressure turbine and from said low-pressure turbine providing a propellant supply for the combustion chamber of said rocket engine, comprising the steps of:

operating said preburner at a temperature, which is high enough so that damage to the blades of said high-pressure turbine would ordinarily occur; and

sending said output flow of the cooling jacket through heat-exchange means prior to being received by said low-pressure turbine, said heat-exchange means in heat exchange relationship with said preburner to extract heat energy from said preburner so that the temperature of the flow being received by said low-pressure turbine is raised, thereby allowing said low-pressure turbopump to be operated at a higher pressure to provide a higher flow rate of fuel through said low-pressure turbopump, and the temperature of the output flow of the preburner is lowered to a level which is below that which will damage the blades of said high-pressure turbine.

4. In a staged-combustion engine having a fuel flow path and an oxidizer flow path, said fuel flow path being split into a first flow path and a second flow path, said split occurring after the fuel leaves a fuel tank and is pumped by a low-pressure fuel pump of a low-pressure turbopump and a high-pressure fuel pump of a high-pressure turbopump, said first flow path including at least one preburner and a high-pressure turbine of a high-pressure turbopump, the output flow of said preburner for supplying the energy for said high-pressure turbine before the fuel enters an injector and is then finally combusted in a main combustion chamber, and said second flow path including a cooling jacket for the main combustion chamber and a low-pressure turbine of a low-pressure turbompump, the output flow of said cooling jacket providing the input flow for said low-pressure turbine which feeds its output to the injector, the improvement comprising:

heat-exchanging means, in heat exchange relationship with said preburner, having a donee element for accepting the output flow of the cooling jacket prior to said output flow of said cooling jacket being sent to said low-pressure turbine, said preburner providing heat energy to the output flow of the cooling jacket in said donee element, whereby,

the temperature of the output flow of the preburner is lowered to a level which will not damage said high-pressure turbopump and the temperature of the output flow of the cooling jacket is raised so that the pressure at the low-pressure turbine is raised and the flow to the main combustion chamber is increased.

4,589,254

REGENERATOR FOR DIESEL PARTICULATE FILTER

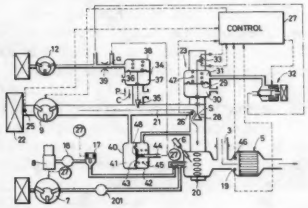
Satoru Kume; Michiyasu Yoshida; Yoshihiro Konno; Tateo Kume, all of Kyoto; Hiroaki Takada, Hyogo; Kiyoichi Shinsei, Hyogo; Akio Matsumoto, Hyogo, and Hitoshi Ogawa, Hyogo, all of Japan, assignors to Mitsubishi Jidosha Kogyo Kabushiki Kaisha and Mitsubishi Denki Kabushiki Kaisha, both of, Japan

Filed Jul. 12, 1984, Ser. No. 630,053

Claims priority, application Japan, Jul. 15, 1983, 58-128780; Jun. 26, 1984, 59-131284

Int. Cl.[4] F01N *3/02*

U.S. Cl. 60—286 **12 Claims**



1. In a filter regenerating apparatus comprising a particulate filter provided in an exhaust gas line from a diesel engine for trapping particulates in exhaust gas from said engine, an exhaust bypass for bypassing said particulate filter, and a burner provided upstream of said particulate filter receiving fuel and air, said exhaust gas being passed through said bypass while said particulates, when trapped in said filter in an amount exceeding a preset level, are burnt in said burner, the improvement wherein said apparatus further comprises a line for supplying air into said burner through an air supply unit, a flow control valve provided in said air supply line for regulating a

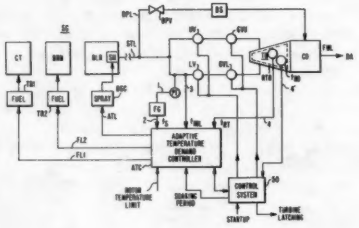
cross-sectional area of said line, a flow control unit for positioning said flow control valve depending upon at least one of a temperature and pressure of air in said supply line, a relief valve provided in said supply line for releasing part of the air in said line to the atmosphere, a relief valve control unit for positioning said relief valve depending upon a difference between a pressure in said supply line at a point upstream of said flow control valve and a pressure at a point downstream thereof, and a combustion control unit for establishing a timing of filter regeneration, thereby causing the exhaust gas to flow into said bypass and actuating said burner.

4,589,255

ADAPTIVE TEMPERATURE CONTROL SYSTEM FOR THE SUPPLY OF STEAM TO A STEAM TURBINE

Alan Martens, Berwyn, and Gerry A. Myers, Swarthmore, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 25, 1984, Ser. No. 664,643
Int. Cl.[4] F01K *13/02*
U.S. Cl. 60—646 **2 Claims**



1. In a combined-cycle steam turbine power generating plant including a heat recovery steam generator for outputting steam at an instantaneous temperature and pressure, and a steam turbine having rotor expanding steam therethrough from said steam generator; means providing a signal representative of the temperature of the rotor of the turbine; and

means for controlling the generation of steam by said steam generator to control the temperature of steam in accordance with a predetermined temperature gradient, the combination of:

function generator means responsive to a signal representative of steam turbine throttle pressure for providing a throttle pressure related steam limit temperature according to a constant enthalpy characteristic;

bias means responsive to said rotor temperature representative signal for providing a bias signal in excess of said rotor temperature signal by a predetermined amount;

means responsive to the larger of said limit temperature signal and said bias signal for controlling the generation of steam by said steam generator to control the temperature of steam to iteratively raise the temperature of the rotor in accordance with said constant enthalpy characteristic and said bias signal during soaking.

4,589,256

STEAM TURBINE PLANT

Masashi Akiba; Ryuji Minagawa, and Sumio Mori, all of Yokohama, Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Oct. 20, 1983, Ser. No. 543,829
Claims priority, application Japan, Oct. 20, 1982, 57-184347
Int. Cl.[4] F01K *13/02*
U.S. Cl. 60—660 **12 Claims**

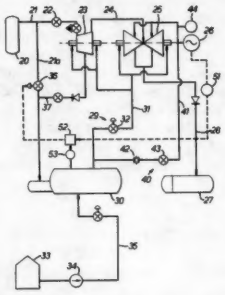
1. A steam turbine plant comprising:

a heat source,

a steam turbine having portions in danger of developing stress corrosion cracking, said steam turbine being provided with a shrink-fit type turbine rotor and a gland seal means,

a first gland seal steam supply apparatus connected to gland seal means for supplying gland seal steam into said gland seal means of said steam turbine,

an evaporator incorporated in said gland seal steam supply



apparatus, said evaporator being adapted for using a part of a main steam and a turbine extraction steam as a heat medium, and

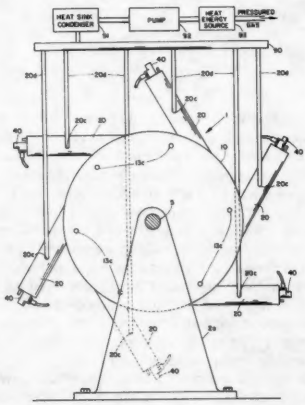
a second steam supply apparatus connected between said evaporator and said turbine for supplying steam generated within said evaporator into said portions of said steam turbine in danger of developing stress corrosion cracking.

4,589,257

METHOD AND APPARATUS FOR EXTRACTING HEAT AND MECHANICAL ENERGY FROM A PRESSURED GAS

Wilbur A. Schaich, San Antonio, Tex., assignor to Centrifugal Piston Expander, Inc., San Antonio, Tex.

Filed Dec. 5, 1984, Ser. No. 678,439
Int. Cl.[4] F01K *13/00*
U.S. Cl. 60—670 **35 Claims**



1. Apparatus for extracting heat and mechanical energy from a pressured gas comprising: a rotatable output member; a linear fluid pressure actuator; means for fixedly mounting said actuator with its linear axis disposed in generally tangential relation relative to the rotation axis of said rotatable member; a one way clutch mounted on said rotatable output member; a lineary moveable output element cooperable with said fluid

pressure actuator and movable between two extreme positions; means operatively connecting said output element to said one way clutch, whereby linear movement of said output element from one extreme position relative to said fluid pressure actuator produces rotation of said output member in one direction and linear movement of said output element toward said one extreme position produces no effect on said rotatable output member; valve means for introducing a pressured gas into said fluid pressure actuator as said output element approaches said one extreme position; thereby driving said output element toward said other extreme position; means for exhausting said pressured gas to ambient pressure when said output element approaches said other extreme position; and means for maintaining an above ambient pressure in the end of said actuator adjacent said other extreme position of said output element, thereby driving said output element away from said other extreme position.

4,589,258

WET-STEAM TURBINE PLANT

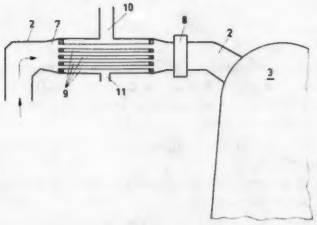
Peter von Böckh, Riniken, Switzerland, assignor to BBC Brown, Boveri & Company, Ltd., Baden, Switzerland

Filed Nov. 15, 1983, Ser. No. 552,028

Claims priority, application Switzerland, Nov. 24, 1982, 6845/82

Int. Cl.⁴ F01K *7/22*

U.S. Cl. 60—679 **5 Claims**



1. A saturated steam turbine installation comprising a high-pressure turbine (1), at least one low-pressure turbine (3), and a generator (4), in which a water separator (6) and a downstream reheater (7) are placed in a connection pipe (2) between said high-pressure turbine (1) and said at least one low-pressure turbine (3), characterized in that said water separator (6) placed in said connecting pipe (2) between said high-pressure turbine (1) and said at least one low-pressure turbine (3) is a high-velocity water separator having flow speeds of 40–70 meters/second and in that said downstream reheater (7) exhibits approximately the same flow cross section as said connecting pipe (2).

4,589,259

GRAVITY PULL ROTOR

Uuno J. Boutto, and George Spector, both of 233 Broadway Rm 3615, New York, N.Y. 10007

Filed Jul. 18, 1985, Ser. No. 756,321

Int. Cl.⁴ F01B *21/04*

U.S. Cl. 60—698 **9 Claims**

1. A gravity operated rotor with an auxiliary motor, which comprises:

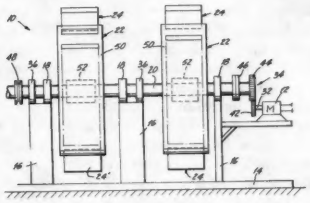
(a) a base member having a pair of vertical spaced mounts, each said mount having a top bearing collar;

(b) a drive shaft rotatably placed through said bearing collars;

(c) a rotor drum concentrically affixed to said drive shaft between said bearing collars;

(d) a plurality of radially extending curved chutes affixed around circumference of said rotor drum;

(e) a plurality of weights, each said weight is slidably placed within one of said chutes, whereby said rotor drum will rotate when said weights within said chutes on one side of said rotor drum slides down away from said drive shaft making said one side heavier and as said chutes on other side of said rotor drum ascends said weights within said chutes will slide down towards said drive shaft making said other



side lighter thus shifting center of gravity by the force of gravity on said weights to keep said rotor drum rotating; and

(f) said auxiliary motor having a shaft mechanically connected to said drive shaft so that when friction eventually slows down the rotor drum said auxiliary motor will assist in rotating said drive shaft.

4,589,260

PRE-MIXING BURNER WITH INTEGRATED DIFFUSION BURNER

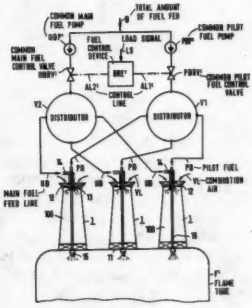
Wolfram Krockow, Düsseldorf, Fed. Rep. of Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mülheim, Fed. Rep. of Germany

Filed Nov. 4, 1983, Ser. No. 549,317

Claims priority, application Fed. Rep. of Germany, Nov. 8, 1982, 3241162

Int. Cl.⁴ F02C *1/00*; F02G *3/00*

U.S. Cl. 60—737 **10 Claims**



1. Burner system for a gas turbine combustion chamber comprising

(a) a pre-mixing burner with an integrated diffusion burner

(b) the pre-mixing burner having a pre-mixing chamber into which chamber a main fuel nozzle and a feeding device for combustion air open, and which chamber is bounded at its downstream end by a flame retention baffle

(c) the diffusion burner having a pilot fuel nozzle arranged in the central region of the flame retention baffle,

(d) fuel control means including a load signal device which generates a signal in accordance with the load of the gas turbine, a fuel control device connected to and operating in response to the load signal device, a main fuel control valve through which fuel flows to the main fuel nozzle, a pilot fuel control valve through which fuel flows to the pilot fuel nozzle, said fuel control device connected to the

main fuel control valve and to the pilot fuel control valve and operating in response to the load signal device controls the flow of fuel through the pilot fuel control valve exclusively from start of the gas turbine to a low load or idling speed or a small partial load of the gas turbine and thereafter to an upper range load of the gas turbine through both the main fuel control valve and the pilot fuel control valve,

(e) said opening in the pre-mixing chamber for the feeding device for combustion air being the sole entrance for the entire combustion air required for the operation of the diffusion burner, and

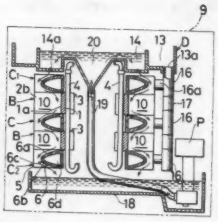
(f) said fuel control device connected to the main fuel control valve and to the pilot fuel control valve and operating in response to the load signal device above the upper range load of the gas turbine controls the flow of fuel through the main fuel control valve exclusively.

4,589,261

ICE MAKING MACHINE AND METHOD OF MANUFACTURE THEREOF

Ryutaro Ohashi, Sakai; Hisashi Hasegawa, Kawachinagano; Masao Miyoshi, Kamagaya; Hajime Iida, Sakai; Toshiyuki Mase, Hirakata; Takashi Tanaka, Sakai; Tsunemasa Funatsu, Sakai, and Tami Nakanishi, Sakai, all of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

Filed Dec. 6, 1983, Ser. No. 558,759
Int. Cl.[4] F25C *5/10*
U.S. Cl. 62—73 **13 Claims**



2. An ice cube making machine comprising:

a plurality of base plates each having a front surface which constitutes a freezing surface, a plurality of longitudinal partition plates projecting from said front surface and laterally spaced from each other by the width of an ice cube to be made, and a plurality of longitudinal hollow tubular bodies projecting from the back surface thereof and laterally spaced therealong, said partition plates and tubular bodies being integrally formed on said base plate to constitute an ice making plate;

at least one hollow spacer having a base with a front surface corresponding to the front surface of said base plate of said ice making plates and having a plurality of longitudinal insert pieces projecting therefrom and spaced laterally along said front surface at distances the same as said longitudinal partition plates are spaced, and a lateral partition plate projecting from said base between each two adjacent longitudinal insert pieces, said ice making plates and said spacer being stacked alternately upon each other with said front surfaces and said partition pieces and insert pieces aligned, said base plates, longitudinal partition plates and lateral partition plates defining among them ice cube making cells, and said longitudinal hollow bodies on each ice making plate being aligned with corresponding longitudinal hollow bodies on the other ice making plates; and

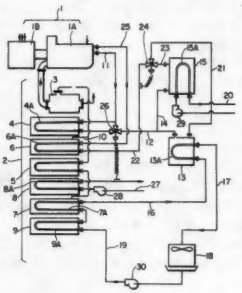
cooling fluid tubes extending through the aligned longitudinal hollow bodies and fixed thereto in heat conducting relationship.

4,589,262

ABSORPTION TYPE AIR CONDITIONING SYSTEM

Masaji Nagao, Ibaraki, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 29, 1985, Ser. No. 759,878
Claims priority, application Japan, Jul. 27, 1984, 59-155264
Int. Cl.[4] F25B *15/00*
U.S. Cl. 62—141 **7 Claims**



1. An absorption type air conditioning system comprising:

an internal combustion engine having an exhaust gas duct and a water jacket;

an absorption type chiller/heater unit having a first generator the heating source of which is the exhaust gas of said internal combustion engine, a second generator the heating source of which is the cooling water heated in said water jacket, a condenser, an evaporator, an absorber and a water heater;

a heat exchanger for radiation which radiates heat into the atmosphere;

a heat exchanger for generating hot water for heating and/or hot water supply;

a cooling tower for emitting the heat of said condenser and said absorber into the atmosphere;

a engine cooling water circulation passage which is so composed as to pass said engine cooling water delivered from said water jacket of said internal combustion engine through said absorption type chiller/heater unit after passing said second generator, said heat exchanger for radiation and said heat exchanger for heating and/or hot water supply; and

first and second control valves disposed in said engine cooling water circulation passage.

4,589,263

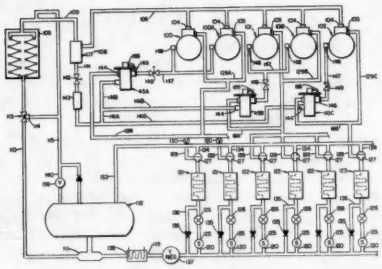
MULTIPLE COMPRESSOR OIL SYSTEM

Leonard J. DiCarlo, Maryland Heights; Roland A. Ares, St. Charles, and Robert O. Norton, Chesterfield, all of Mo., assignors to Hussmann Corporation, Bridgeton, Mo.

Continuation-in-part of Ser. No. 599,347, Apr. 12, 1984, Pat. No. 4,503,685, which is a division of Ser. No. 442,967, Nov. 19, 1982, Pat. No. 4,478,050. This application Oct. 18, 1984, Ser. No. 662,029
The portion of the term of this patent subsequent to Mar. 12, 2002, has been disclaimed.
Int. Cl.[4] F25B *31/00*
U.S. Cl. 62—193 **9 Claims**

1. An oil return system for a multiple compressor refrigeration system in which said compressors have a common high pressure discharge side and at least two of said compressors have a low pressure suction side connected to operate at different suction pressures, said oil return system comprising liquid oil reservoir means connected to the high pressure discharge side of said compressors, oil delivery means for sensing the oil level at the low pressure suction side of said compressors and

for feeding oil to maintain such oil level for each compressor, and separate oil control valve means disposed between said reservoir means and said oil delivery means for each of said two compressors, said oil control valve means for each said compressor having pressure means responsive to the pressure



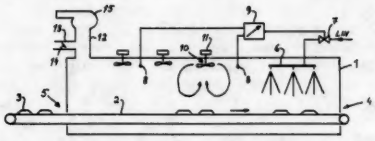
differential between its own downstream oil outlet pressure and the suction pressure of said compressor being fed thereby for transferring oil from the reservoir means to the oil delivery means at a selected low side differential pressure relative to the compressor suction pressure acting thereon.

4,589,264

TUNNEL FREEZER

Sture Aström, Byalagsgatan 36, Helsingborg, Sweden (S-252 60)

Continuation of Ser. No. 553,969, Nov. 21, 1983, abandoned.
This application Jan. 9, 1985, Ser. No. 690,368
Claims priority, application Sweden, Nov. 22, 1982, 8206627
Int. Cl.[4] F25D *17/02*
U.S. Cl. 62—374 **8 Claims**



1. A tunnel freezer for freezing products wherein the products are transported through a tunnel from an infeed end to an outfeed end by a conveyor having a preestablished width comprising:

spray nozzles adjacent the outfeed end for spraying a cryogenic liquid on the products; and

means for circulating gas, said circulating means being positioned in the tunnel upstream of said spray nozzles with respect to the direction of the transportation of the products;

wherein said circulating means includes at least one paddle wheel positioned immediately above the products, the diameter of the paddle wheel being slightly smaller than the width of the conveyor, and

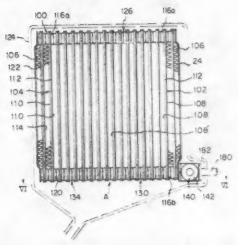
wherein the conveyor has two paths, and at least one paddle wheel is positioned between said two paths, said paddle wheel being driven by a suitable transmission.

4,589,265

HEAT EXCHANGER FOR AN AIR CONDITIONING SYSTEM EVAPORATOR

Kazuo Nozawa, Konan, Japan, assignor to Diesel Kiki Company, Ltd., Tokyo, Japan

Filed Nov. 8, 1984, Ser. No. 669,400
Claims priority, application Japan, Nov. 14, 1983, 58-175734
Int. Cl.[4] F25B *39/02, 41/06;* F28D *1/02*
U.S. Cl. 62—526 **6 Claims**



1. A heat exchanger comprising:

a plurality of hollow panels arranged in a stack with fins interspersed therebetween and each having right and left vertical fluid passageways therein and upper and lower headers communicating with upper and lower ends of said fluid passageways respectively;

said panels being arranged in front and rear groups such that a front right lower header communicates with lower ends of said front right fluid passageways, a front right upper header communicates with upper ends of said front right fluid passageways, a rear right upper header communicates with upper ends of said rear right fluid passageways and with said front right upper header, a rear right lower header communicates with lower ends of said rear right fluid passageways, a rear left lower header communicates with lower ends of said rear left fluid passageways and with said rear right lower header, a rear left upper header communicates with upper ends said rear left fluid passageways, a front left upper header communicates with upper ends of said front left fluid passageways and with said rear left upper header, and a front left lower header communicates with lower ends of said front left fluid passageways;

an end plate applied to an end of said stack and formed with an inlet opening and an outlet opening adjacent to said inlet opening each of which communicates to a fluid circulation path defined in said stack by said fluid passageways and said upper and lower headers of said hollow panels, said inlet opening communicating with one of said front right lower header and said front left lower header and said outlet opening communicating with the other of said front right lower header and said front left lower header respectively;

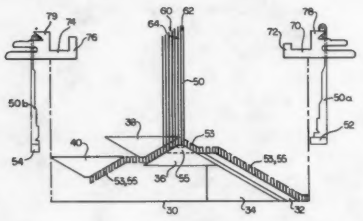
inlet and outlet manifold means mounted on said end plate for fluidly communicating said inlet opening of said end plate to an inlet conduit and said outlet opening to an outlet conduit;

expansion valve means built in said inlet and outlet manifold means for controlling a quantity of an incoming flow of fluid directed from said inlet conduit toward the fluid circulation path in the stack via the manifold means and the inlet opening of the end plate in response to a temperature and a pressure of an outgoing flow of the fluid directed from the fluid circulation path toward the outlet conduit via the outlet opening of the end plate and the manifold means.

4,589,266
CIRCULAR TERRY KNITTING MACHINE AND METHOD

C. Mitchell Oakley, Jr., Greensboro, and William L. Chatman, Madison, both of N.C., assignors to Stancil Textile Co., Inc., Greensboro, N.C.

Division of Ser. No. 495,142, May 16, 1983, abandoned. This application Jul. 9, 1984, Ser. No. 627,510
Int. Cl.[4] D04B 9/12, 15/06
U.S. Cl. 66—12 5 Claims



1. Method of knitting a cushioned shin (front) area in the leg portion of a seamless athletic sock on a circular, single drum machine, which sock also has a cushioned sole formed on the underside (rear) of the foot portion, said method comprising the steps of:

(a) providing long butt needles in one semi-circular half of the needle cylinder that corresponds to the front area of the sock and short butt needles on the other semi-circular half of the needle cylinder that corresponds to the rear area of the sock;

(b) feeding in a body yarn at a first lower feed position and at least one terry yarn at a second terry feed position above said first position;

(c) in advance of the yarn feed stations lifting the long butt needles alone to an elevation corresponding to the aforesaid second terry feed position while maintaining the short butt needles at an elevation corresponding to said first position and below said second position;

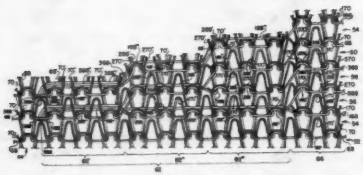
(d) with said long butt needles pulling said terry yarn down over the upper nibs of terry sinkers while simultaneously pulling said body yarn over the main loop forming edge of said terry sinkers to form said cushioned shin area; and

(e) said short butt needles pulling said body yarn alone down over said sinkers to form said rear area which is void of terry loops.

4,589,267
METHOD AND APPARATUS FOR PRODUCING HOSIERY ARTICLE

Jack C. Barbee, Gastonia, N.C., assignor to Speizman Industries, Inc., Charlotte, N.C.

Continuation of Ser. No. 438,407, Nov. 1, 1982, abandoned. This application Sep. 13, 1984, Ser. No. 650,972
Int. Cl.[4] D04B 9/12, 9/56
U.S. Cl. 66—12 26 Claims



1. In a method of knitting a tubular hosiery article of terry fabric having yarn formed in needle, sinker and terry loops extending in circumferential courses and axial wales, said knitting method being performed on a circular knitting machine having respective circles of movable knitting needles and sinkers cooperatively arranged in assocciation for relative knitting movement, each of said sinkers being of the type having a basic sinker loop forming surface and a raised terry loop forming surface spaced therefrom, the improvement comprising rotationally operating said knitting machine to knit an axially contoured terry fabric portion of said hosiery article by progressively repeating the steps of:

(a) forming a circumferentially complete course of terry fabric in substantially all said wales of said hosiery article to extend fully circumferentially thereabout, said forming said complete course including:

(1) feeding one base yarn and one pile yarn to substantially all said needles and associated sinkers, and

(2) manipulating said substantially all said needles and associated sinkers to knit said one base and pile yarns in needle loops of each thereof in plated relationship on said substantially all said needles, in sinker loops of said one base yarn on the basic sinker loop forming surfaces of the associated sinkers, and in elongated terry loops of said one pile yarn on said raised terry loop forming surfaces of the associated sinkers; and

(b) forming a first circumferentially incomplete course of terry fabric extending only partially circumferentially about said hosiery article, said first incomplete course having another base yarn in only a selected substantially successively arranged partial number of said wales of said hosiery article and terminating at the adjacent nonselected wales and having another pile yarn in only a predominant portion of said selected wales and terminating at the adjacent selected wales, said forming said first incomplete course including:

(1) feeding said another base yarn to only a selected substantially successively arranged partial number of said needles and to sinkers associated therewith by feeding a leading end of said another base yarn initially to at least one leading needle of said selected needles and the associated at least one leading sinker and feeding the trailing length of said another base yarn thereafter to the other said selected needles and sinkers associated therewith,

(2) feeding said another pile yarn to only a predominant portion of said other selected needles successively following said at least one leading needle and to sinkers associated therewith by feeding a leading end of said another pile yarn initially to a leading one of said predominant portion of said other selected needles and feeding the trailing length of said another pile yarn thereafter to the remaining ones of said predominant portion of said other selected needles and sinkers associated therewith,

(3) tucking said leading end of said another base yarn on said at least one leading needle of said selected needles and manipulating said at least one leading needle to draw said leading end of said another base yarn onto said basic sinker loop forming surface of the associated at least one leading sinker in advance of said feeding said another pile yarn,

(4) manipulating said predominant portion of said other selected needles and sinkers associated therewith to knit said trailing length of said another base yarn and said leading end and trailing length of said another pile yarn in needle loops of each thereof in plated relationship on said predominant portion of said other selected needles, in sinker loops of said another base yarn on the basic sinker loop forming surfaces of the associated sinkers and in elongated terry loops of said another pile yarn on said raised terry loop forming surfaces of the associated sinkers, and

(5) cutting said trailing length of said another base yarn following the trailing one of said selected needles and cutting said trailing length of said another pile yarn

following the trailing one of said predominant portion of said other selected needles,

(6) said tucking said at least one leading end of said another base yarn and said manipulating said at least one leading needle constraining said trailing length of said another base yarn onto said basic sinker loop forming surfaces of the sinkers successively following said at least one leading sinker to prevent accidental positioning of said another base yarn on said raised terry loop forming surfaces thereof for achieving distinct formation of said sinker loops with said another base yarn and of said terry loops with said another pile yarn,

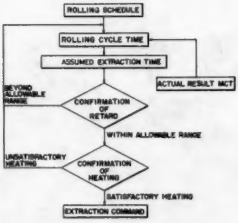
whereby a number of said first incomplete courses are produced along one circumferential portion of said hosiery article to create a greater axial fabric extent therealong than along the remaining circumferential portion of said hosiery article to impose a fabric curvature that forms said contoured portion.

4,589,268

METHOD OF CONTROLLING MILL PACING

Kazuyuki Sakurada; Takanori Fujiwara, and Yutaka Funyu, all of Handa, Japan, assignors to Kawasaki Steel Corporation, Hyogo, Japan

Filed Apr. 25, 1984, Ser. No. 603,632
Int. Cl.[4] B21B *37/00*
U.S. Cl. 72—8 **1 Claim**



1. A method of controlling a mill pacing in a rolling equipment wherein a plurality of rolling mills are provided downstream of a heating furnace in which a plurality of materials rest on a furnace hearth integrally moving with the materials for successively extracting said materials from said furnace, comprising the steps of:

(a) predetermining an allowable retard period of time r_x for said materials;

(b) calculating a presupposed retard period of time h_x from the following equation:

$$h_x = \sum_{c=1}^{h} MCTx(i) - (T_n - T_1)$$

wherein MCTx(i) is a presupposed rolling cycle time (MCT) of a material i counted from the latest material to be started for rolling in a rolling mill x, T_n is a target extraction time of a subsequent material n to be extracted from the heating furnace and T_1 is an actual time the latest material to be started for rolling in the rolling mill x is extracted from the heating furnace;

(c) calculating a difference f_x between the predetermined allowable retard period of time r_x and the presupposed retard period of time h_x from the following equation:

$$h_x = \sum_{c=1}^{h} MCTx(i) - (T_n - T_1) - r_x$$

(d) determining the maximum difference F for each of the rolling mills x from 1 to m from the following equation:

$$F = MAX(f_1 \ldots f_x \ldots f_m)$$

(e) confirming that the allowable retard period of time r_x is acceptable if $F \leqq 0$ and not acceptable if $F > 0$;

(f) continuing with step (g), if r_x is acceptable or predetermining another allowable retard period of time r_x and repeating the steps (a) through (f) if r_x is not acceptable;

(g) calculating a furnace neck extraction cycle time CT_m for said particular material m from 1 to n as a function of the type of material m, a diameter D_m of the material m and a length L_m of the material m from the following equation:

$$CT_m = f(D_m, L_m)$$

(h) determining a heating critical cycle time HCT sufficient for applying heat of a predetermined value to the material 1 to n including the subsequent material to be extracted and the latest material to be extracted from the heating furnace from the following equation:

$$HCT = MAX(CT_1 \ldots CT_m \ldots CT_n)$$

(i) determining if the heating critical cycle time HCT is the time interval between the extraction of the subsequent material and a preceding material; and

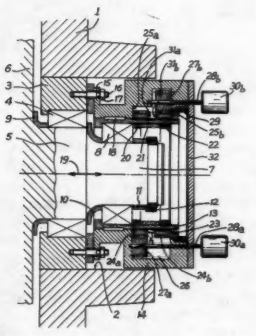
(j) extracting the material at the heating critical cycle time HCT if the heating critical cycle time is the time interval between the extraction of the subsequent material and a preceding material or predetermining another allowable retard period of time r_x and repeating steps (a) through (j) if the heating critical time HCT is not said time interval.

4,589,269

DEVICE FOR MOVING AND AXIALLY ADJUSTING HORIZONTAL ROLLS OF A SECTION ROLLING MILL STAND

Jacques Michaux, 91, rue de Franchepré , 54240 Joeuf, France

Filed Jun. 6, 1984, Ser. No. 617,625
Claims priority, application France, Jun. 10, 1983, 83 09679
Int. Cl.[4] B21B *31/18*
U.S. Cl. 72—247 **6 Claims**



1. An apparatus for axially adjusting a horizontal roll of a section rolling mill stand of the type including an axial thrust bearing mounted within an envelope defined by a casing attached to the stand and fast with the roll, said apparatus comprising:

a sleeve fast with the axial thrust bearing for transmitting axial displacement of the sleeve to the roll via said bearing, said sleeve having an externally threaded section;

mounting means for mounting said sleeve within said envelope for allowing reciprocating axial sliding movement of said sleeve and for blocking rotation thereof;

first and second pinion nuts threadedly mounted in confront-

ing rotation on the externally threaded section of said sleeve;

first and second pinion nut stop means formed on said casing adjacent said first and second pinion nuts, respectively, for limiting axial movement of said pinion nuts;

first and second pinion nut drive means for controllably rotating, respectively, said first and second pinion nuts, only one of said pinion nuts being controllably rotated at any one time; and

clutch means formed on said pinion nuts for transmitting rotation from said one controllably rotated pinion nut to the other driven pinion nut and for allowing rotation of said controllably rotated pinion nut through a predetermined angle before said clutch means engages for drivably rotating said other pinion nut;

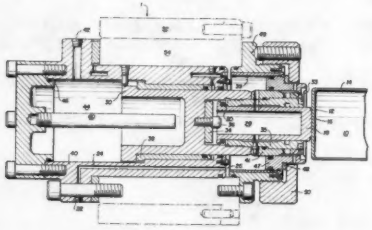
whereby when said clutch means is engaged and said one pinion nut is drivably rotating said other nut, said sleeve is displaced axially for adjusting the axial position of said roll, and when the rotation of said one controllably rotated pinion nut is reversed, said clutch means disengages and said one pinion nut is rotated in the reverse direction into a locking position against its respective stop means securing said sleeve against unintended axial movement.

4,589,270

HYDRAULIC BOTTOM FORMER

Harry W. Lee, Jr., Chesterfield County, and Joseph W. Wallace, Henrico County, both of Va., assignors to Reynolds Metals Company, Richmond, Va.

Filed Apr. 30, 1985, Ser. No. 728,816
Int. Cl.[4] B21D *22/00*
U.S. Cl. 72—348 **3 Claims**



1. In a draw and iron press for forming a can body including means for forming a bottom structure on said can body, said means for forming a bottom structure comprising a punch over which said can body is carried having a first die structure, a bottom former having a die structure which mates with said first die structure when said can body is contacted between said punch and said bottom former under pressure and means for resiliently mounting said bottom former for contact with said can body under pressure the improvement wherein said means for resilient mounting comprises a hydraulic cylinder connected to a source of hydraulic fluid under pressure up to 750 PSIG to provide a force up to 9500 pounds to said bottom former sufficient to permit said bottom structure to be formed without wrinkling.

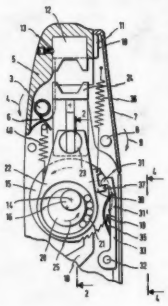
4,589,271

TWO-ARMED HAND-LEVER PRESS

Friedrich-Günther Laux, Quitzowstrasse 24-26, D-1000 Berlin 21, Fed. Rep. of Germany

Filed Mar. 2, 1984, Ser. No. 585,840
Int. Cl.[4] B21D *39/00*; B23P *11/00*
U.S. Cl. 72—449 **9 Claims**

1. In a two-armed hand-lever press, particularly for the solderless connecting of electric cables, lines or the like by means of a cable bracket, a cable sleeve or the like inserted into the point of connection to be deformed by pressing, where a pressing tool housing contains a fixed press die and a movable press die which is movable relative to the fixed press die and actuable by at least one eccentric and by a pawl from a lever arm coupled to one of said two-armed hand-levers, the improvement comprising resilient spring means for urging the movable press die toward the fixed press die and a pivotable stop means for selectively restraining said movable press die at a position away from said fixed press die against the force of the resilient spring means.

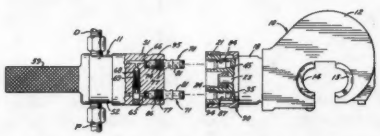


4,589,272

APPARATUS FOR CONNECTING A HYDRAULICALLY ACTUATED TOOL TO A CONTROL VALVE

Roy C. Hutson, 1418 Sandy Hollow Rd., Rockford, Ill. 61109

Filed Mar. 25, 1985, Ser. No. 715,882
Int. Cl.[4] B21J *9/18*
U.S. Cl. 72—453.16 **8 Claims**



1. The combination of, a hydraulically operated tool, a hydraulic control valve, and means for quickly connecting said tool directly to said control valve;

said tool comprising a tool member, a reciprocating actuator connected to said tool member, said actuator being operable to cause said tool member to shift in one direction when pressurized oil is supplied to one side of the actuator and being operable to cause said tool member to shift in the opposite direction when oil is exhausted from said one side of said actuator, and a body connected to said actuator and having first and second passages with one of said passages communicating with said one side of said actuator, said body also having first and second sockets in one end thereof and communicating with said first and second passages, respectively;

said hydraulic control valve comprising a body having first and second passageways, said valve body also having first and second sockets in one end thereof and communicating with said first and second passageways, respectively, a valve member movable relative to said valve body between first and second positions, said valve member being operable when in said first position to cause pressurized oil to be supplied through one of said passageways and being operable when in said second position to cause oil to be exhausted through one of said passageways,

and said connecting means comprising first and second fittings each having a passage means formed therethrough, each fitting being anchored in a socket in one of

said bodies, projecting from such body and being sized to telescope slidably within a socket in the other of said bodies, the passage means in said first fitting establishing communication between said first passage of said tool and said first passageway of said valve, the passage means in said second fitting establishing communication between said second passage of said tool and said second passageway of said valve, and said connecting means further comprising a threaded coupler rotatably supported by one of said bodies and adapted to be threadably connected to the other body, said coupler being operable when tightened to clamp said bodies together and keep said fittings telescoped in said sockets, said coupler being operable when loosened to permit complete separation of said bodies and to permit said fittings to slide out of telescoping relation with said sockets thereby to enable said tool to be detached from said control valve.

4,589,273

METHOD OF TESTING SHOCK ABSORPTION OF A SPRING RUNNING GEAR, PARTICULARLY UNDERCARRIAGE OF A ROAD MOTOR VEHICLE WITH ELASTIC TIRES AND APPARATUS FOR PERFORMING THE METHOD

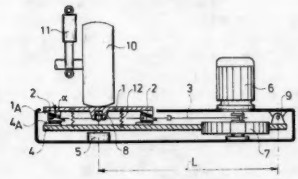
Attila Tamasi; Mihály Kardos, and László Faragó, all of Budapest, Hungary, assignors to "Transinnov" Kozlekedesi Muszaki Fejleszto Leanyvallalat, Budapest, Hungary

Filed Nov. 14, 1984, Ser. No. 671,448

Claims priority, application Hungary, Nov. 14, 1983, 3885/83

Int. Cl.⁴ G01M *17/04*

U.S. Cl. 73—11 **6 Claims**



1. A method of testing shock absorption of a spring running gear, particularly undercarriage of a road motor vehicle with elastic tires comprising the steps of:

jouncing a wheel of said spring running gear upward through its natural frequency (ω) by an energizing frequency of constant amplitude;

measuring a minimum wheel load (F_m) at about a maximum frequency;

slowing down the oscillating of said wheel by reducing of the energizing frequency while measuring a minimum wheel load (F_ω) at the natural frequency (ω) of the running gear;

forming a ratio (k) from the minimum wheel load (F_ω) at the natural frequency (ω) and the minimum wheel load (F_m) at the maximum frequency according to the formula: $k=F_\omega/F_m \cdot 100\%$; and

qualifying the damping of said running gear depending on the value of the ratio (k).

3. Apparatus for testing of shock absorption of a spring running gear, particularly undercarriage of a road motor vehicle with elastic tires comprising:

a support plate constituting a wheel supporting surface;

energizing means connected to said support plate through intermediate means;

at least one force sensing unit connected to an electronic measuring unit and to the intermediate means, wherein the energizing means is provided with wedging means (2) driven by a crank mechanism (3) and mounted between upper operating surfaces (1_A) formed on the bottom of the support plate (1) and lower operating surfaces (4_A) formed on the intermediate means developed as a two-support beam (4), and the upper and/or lower of the operating surfaces (1_A, 4_A resp.) include a bevel (α) to the horizontal, and one of the supports of the two-support beam (4) is constituted by the at least one force sensing unit (5).

4,589,274

METHOD AND APPARATUS FOR CONTINUOUSLY DETECTING AND MONITORING THE HYDROCARBON DEW-POINT OF A GAS

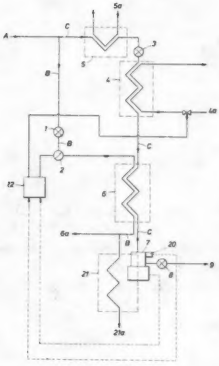
George J. Boyle, and Frederick R. Pritchard, both of Chester, England, assignors to Shell Oil Company, Houston, Tex.

Filed Aug. 29, 1984, Ser. No. 645,199

Claims priority, application United Kingdom, Aug. 30, 1983, 8323260

Int. Cl.⁴ G01N *25/12*

U.S. Cl. 73—29 **6 Claims**



1. A method for monitoring the dew-point of a gas, comprising:

providing a sample of said gas;

dividing said sample into a first and second portion and expanding said second portion to cool said first portion;

cooling a first portion of said sample until condensate is formed therein;

detecting said condensate in said first portion of said sample;

warming said first portion of said sample until condensate is removed therefrom;

detecting said removal of said condensate from said first portion of said sample; and thereafter

alternately cooling and warming said first portion of said sample in response to the detection of absence or presence of condensate in said first portion of said sample.

4,589,275

PIPE COATING

Samuel J. Thomas, Hamilton; James M. Robich, Watertown, both of Mass., and Robert L. Hayes, Walnut Creek, Calif., assignors to The Kendall Company, Boston, Mass.

Division of Ser. No. 369,036, Apr. 16, 1982, Pat. No. 4,523,141.

This application Jul. 13, 1984, Ser. No. 630,439

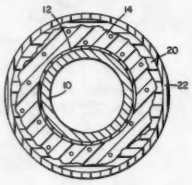
Int. Cl.⁴ G01M *3/00*

U.S. Cl. 73—40.5 R **3 Claims**

1. In a pipe coated with a thermal insulating layer of foamed plastic polymeric material having an irregular outer surface and an outer barrier layer of non-foamed plastic polymeric material,

the improvement comprising an intermediate layer interposed between and bonded to said insulating layer and

said outer barrier layer to facilitate detection of pinholes and other discontinuities in said outer barrier layer, said



intermediate layer having an inner face which mates with the irregularities of said insulating layer and an outer face smooth and substantially free from said irregularities.

4,589,276

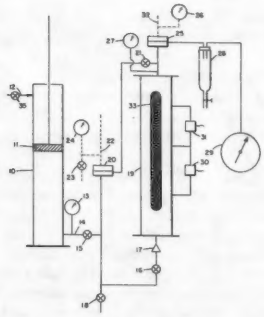
METHOD AND APPARATUS FOR DETERMINING EFFECTIVENESS OF FOAMANT IN POROUS MEDIA

Nizar F. Djabbarah, Richardson, Tex., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 12, 1984, Ser. No. 680,865

Int. Cl.[4] G01N *13/00, 33/28*

U.S. Cl. 73—60.1 **8 Claims**



1. Apparatus for determining the foaming characteristics of a foamant for use in the recovery of oil from subterranean oil-bearing formations by gas flooding operations, under conditions simulating those in the formation, comprising:

(i) a test cell containing a packing medium and having observation means for viewing the interior of the cell from the outside of the cell,

(ii) a first inlet at the top of said cell through which the interior of the test cell is pressurized to a gas pressure simulating the reservoir pressure of said subterranean formation, and

(iii) a second inlet air the bottom of said cell through which gas is passed into the packing medium in the cell in the presence of a liquid including the foamant at a predetermined flow rate.

4,589,277

PROCESS AND APPARATUS FOR DETERMINING THE PERCENTAGE OF A LIQUID CONTAINED IN A LIQUID MIXTURE

Hans-Jürgen Collins, Im Sieke 45, and Kurt Lhotzky, Heimgarten 17a, both of 3300 Braunschweig, Fed. Rep. of Germany

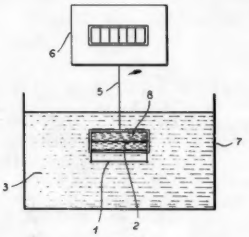
PCT No. PCT/EP83/00297, § 371 Date Jun. 29, 1984, § 102(e) Date Jun. 29, 1984, PCT Pub. No. WO84/02003, PCT Pub. Date May 24, 1984

PCT Filed Nov. 11, 1983, Ser. No. 629,839

Claims priority, application Fed. Rep. of Germany, Nov. 18, 1982, 3242506

Int. Cl.[4] G01K *7/16;* G01N *27/18*

U.S. Cl. 73—61.1 R **12 Claims**



1. A process for determining the percentage of a given liquid in a liquid mixture, said given liquid having a lower evaporation temperature than said mixture, comprising the steps of:

(a) immersing an electric resistance wire having a positive temperature coefficient in a sample of a known composition of said mixture;

(b) temporarily rapidly heating said resistance wire by applying varying quantities of energy thereto in the form of electric current impulses;

(c) measuring as a measured quantity the time intervals required for energy conversion to occur in said resistance wire and determining the region of the energy quantities within which the time intervals of the energy conversions change noticeably and suddenly; and

(d) immersing said resistance wire into a test sample of a liquid mixture of unknown composition and applying to the resistance wire in said test sample the quantities of energy determined with said sample of known composition, whereby when the measured time intervals change noticeably, said intervals are compared with the intervals determined with said sample of known composition to establish the percentage of said given liquid in said test sample.

4,589,278

DETECTION OF TOP OF STROKE OF PISTON

Haskell Ginns, Belmont, Mass., assignor to Indikon Corporation, Cambridge, Mass.

Filed May 31, 1984, Ser. No. 615,993

Int. Cl.[4] G01M *15/00*

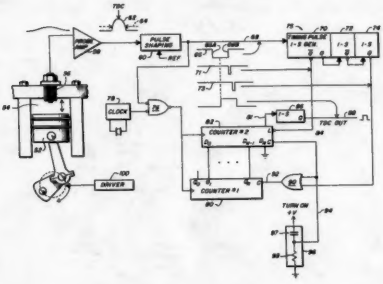
U.S. Cl. 73—117.3 **2 Claims**

1. A system for determining the maximum excursion of each stroke of a driven reciprocating, piston element relative to a cylinder head for said piston, comprising:

sensing means located within said cylinder head and spaced apart from said element for providing a signal representing the distance between said sensing means and said piston element only as said piston element approaches said cylinder head;

threshold means for providing an output signal when said distance respresenting signal exceeds a signal threshold representative of said piston being only within a few degrees of the maximum excursion of said piston element relative to said cylinder head;

counter means for counting during the occurrence of said output signal to provide a count representing the duration of the output signal of said threshold means; and



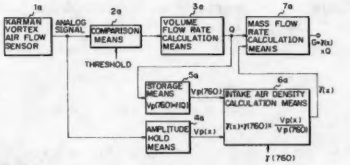
means for counting to the half point of said count on the next succeeding stroke of the piston element to provide an indication of actual piston maximum excursion as it occurs.

4,589,279

APPARATUS AND METHOD FOR DETECTING INTAKE AIR MASS FLOW RATE

Masaki Mitsuyasu; Toshiyuki Takimoto, and Keiji Aoki, all of Susono, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed May 13, 1985, Ser. No. 733,146
Claims priority, application Japan, Sep. 4, 1984, 59-183783
Int. Cl.[4] G01F *1/32*
U.S. Cl. 73—118 **4 Claims**



1. An intake air mass flow rate detection apparatus using a Karman vortex air flow sensor, comprising a Karman vortex air flow sensor arranged in an intake passage of an internal combustion engine, comparison means for obtaining a digital signal by comparison of an analog signal obtained from the output of said Karman vortex air flow sensor with a predetermined threshold level, and volume flow rate calculation means using a value proportional to the frequency of said digital signal as the intake air volume flow rate and further provided with:

amplitude hold means for holding the amplitude value of analog signals obtained from the output of said Karman vortex air flow sensor;

storage means for storing in advance a relationship between the intake air volume flow rates and the amplitude values of the analog signals obtainable from the output of said Karman vortex air flow sensor under standard atmospheric pressure;

an intake air density calculation means for calculating an intake air density $\gamma(x)$ in accordance with the formula:

$$\gamma(x)=\gamma(760)\times V_p(x)/V_p(760)$$

where $\gamma(760)$ is the air density under standard atmospheric pressure, $V_p(x)$ is the amplitude value of the analog signal held in the amplitude hold means, and $V_p(760)$ is the amplitude value of the analog signal under standard atmospheric pressure, said $V_p(760)$ being stored in said storage means and corresponding to the intake air volume flow rate from said volume flow rate calculation means; and

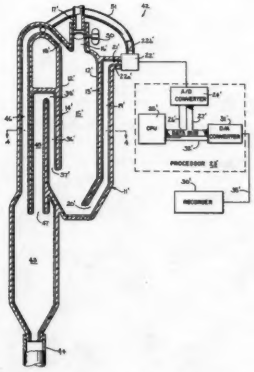
mass calculation means for multiplying the intake air volume flow rate obtained by said volume flow rate calculation means by said intake air density for obtaining the intake air mass flow rate.

4,589,280

FLUID FLOW METER UTILIZING PRESSURE SENSING

Garry L. Carter, Racine, Wis., assignor to Medical Engineering Corporation, Racine, Wis.

Continuation-in-part of Ser. No. 447,759, Dec. 8, 1982, abandoned. This application Oct. 30, 1984, Ser. No. 666,358
Int. Cl.[4] G01F *3/38*
U.S. Cl. 73—226 **3 Claims**



1. A disposable container for use in a meter pump apparatus in which a pressure transducer produces a signal which is proportional to an air pressure within the container which varies in accordance with the volume of liquid within the container, comprising:

an interior chamber defining a first cavity and having an upper portion with an inlet opening for admitting the liquid into the first cavity;

an integral first conduit defining a passageway and having a lower opening which opens into the first cavity below the inlet opening and an upper opening which is suitable to operatively mount the pressure transducer so that the upper opening is in communication with the first cavity below the inlet opening and the air pressure in the first passageway varies in accordance with the volume of liquid in the first cavity when the level of the liquid is above the lower opening of the first passageway and the upper opening of the first passageway is sealed by the pressure transducer;

an integral second conduit defining a second passageway and having a lower outlet opening in communication with the first cavity above the lower opening of the first passageway and an upper outlet opening below the upper opening of the first passageway;

an integral second chamber defining a second cavity below the upper outlet opening of the second conduit and having a lower opening which is suitable for connection to a feed tube;

an integral third conduit defining a third passageway between the upper outlet opening of the upper portion of the second passageway and the upper portion of the second cavity;

an integral fourth conduit defining a fourth passageway

between the upper portion of the first cavity and the upper portion of the second cavity for providing communication between the first cavity and the second cavity so that when the second cavity is primed with a quantity of liquid, a partial vacuum is developed in the container and the admission of liquid into the first cavity pumps a similar quantity of liquid from the second cavity and liquid is transferred from the first cavity to the second cavity by siphon action when the level of liquid within the first cavity reaches the upper outlet opening of the second passageway; and

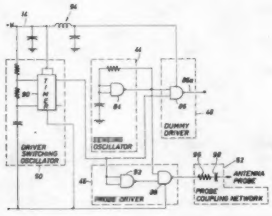
means for controlling the flow of liquid into the first cavity to meter the volume of liquid pumped from the second cavity.

4,589,281

MATERIAL LEVEL DETECTOR AND CONTROL

Joe L. Aldrich, Kingwood, Tex., assignor to Keystone International, Inc., Houston, Tex.

Filed Sep. 20, 1984, Ser. No. 653,028
Int. Cl.[4] G01F *23/26*
U.S. Cl. 73—290 R **43 Claims**



1. Apparatus for detecting the presence or absence of material at a location comprising sensing means, including:

a. oscillator means for providing an oscillatory output signal;

b. reference means, for receiving said oscillatory output signal and providing a reference;

c. sensor means, including antenna probe means for positioning at said location, and for receiving said oscillatory output signal;

d. switching means for alternately permitting said oscillatory output signal to be applied to said reference means and to said antenna probe means;

e. an electrical energy source for providing electrical energy for application to said oscillator means by connection means whereby the absence of material, to be sensed, at said location, is accompanied by substantially the same rate of electrical energy consumption by said oscillator means when said oscillatory output signal is applied to said antenna probe means as when said signal is applied to said reference, and, with such material present at said location, electrical energy is consumed by said oscillator means at a greater rate when said signal is applied to said antenna probe means compared to when said signal is applied to said reference; and

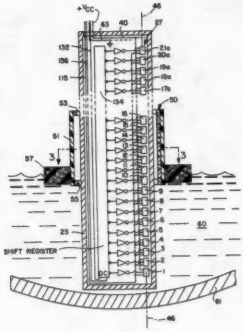
f. means for detecting a change in the rate of energy consumption from said electrical power source whereby the presence or absence of said material at said location may be determined.

4,589,282

FINE RESOLUTION LIQUID LEVEL DETECTOR

Stefaan D. Dumery, Shrewsbury, Mass., assignor to Sprague Electric Company, North Adams, Mass.

Continuation-in-part of Ser. No. 363,183, Mar. 29, 1982, Pat. No. 4,466,284. This application Aug. 20, 1984, Ser. No. 642,459
Int. Cl.[4] G01F *23/38*
U.S. Cl. 73—313 **2 Claims**



1. A fine resolutrion liquid level detector comprising:

(a) a column of uniformly spaced Hall-sensors, each of said Hall-sensors being capable of producing at an output thereof one type of electrical signal when in a magnetic field of one polarity and being capable of producing at said output another type electrical signal when in another polarity of magnetic field;

(b) a compound megnet assembly for producing at said column a fixed pattern of spaced apart magnetic field regions of said one polarity, there being only a number n of said regions, each of said regions having a uniform center to center spacing b as measured along the axis of said column, b being greater than a and

$$b = \left(2 - \frac{1}{n}\right) a$$

wherein a is said uniform spacing of said Hall-sensors;

(c) means for holding said column vertically in a liquid;

(d) means for guiding said compound magnet assembly along and at a substantially fixed distance from said Hall-sensors column; and

(e) means for keeping said compound magnet assembly at the surface of said liquid.

4,589,283

ASCENT GAUGE FOR DIVERS

Francis V. Morrison, Jr., 28 Water St., Charlestown, Mass. 02129

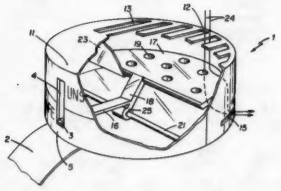
Filed Jul. 18, 1984, Ser. No. 632,126
Int. Cl.[4] G01F *23/14*
U.S. Cl. 73—432 R **11 Claims**

1. A gauge for warning a scuba diver of an unsafe rate of ascent in the ocean or sea comprising:

a casing with top, bottom, front and back sides, the top side of which has openings positioned toward the back side, the front side of which has a vertical opening approximately in the middle, and the back side of which has openings positioned toward the bottom;

a horizontal element fastened to and positioned within the casing perpendicular to the front and back sides approximately in the middle across the inside of the casing in a plane parallel to the top and bottom sides;

a disk pivotally attached within the casing to the horizontal element; and



a longitudinal element with two ends, one end of which is joined to the disk, and the other end of which is positioned at the casing front side opening.

4,589,284

ULTRASONIC TOMOGRAPHY UNIT

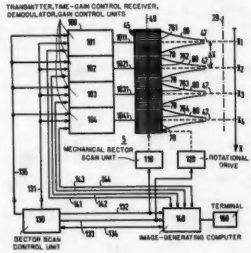
Fritz Breimesser, Erlangen; Dietrich Hassler, Uttenreuth; Eckart Hundt, Haar; Gerd Maderlechner, Groebenzell, and Elmar Trautenberg, Fuerth, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Filed Dec. 17, 1984, Ser. No. 683,304

Claims priority, application Fed. Rep. of Germany, Dec. 27, 1983, 3347200

Int. Cl.[4] G01N *29/04*

U.S. Cl. 73—626 **2 Claims**



1. An ultrasonic head for use in ultrasonic tomography units for scanning an object line by line from a plurality of angles using a rotational drive which rotates the head about an axis, comprising:

a linear array of ultrasonic transducer elements, the array being perpendicular to a section plane of the object and being rotatable about its axis; and

means for controlling the transducer elements in groups such that a plurality of groups are controlled in such a manner as to simulate simultaneous control thereof, selected groups each form by coaction a beam aperature and adjacent ones of said selected groups are separated from each other by a group of unenergized transducer elements, and ultrasonic beams produced by the groups are non-overlapping.

4,589,285

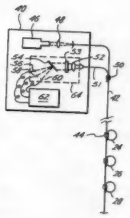
WAVELENGTH-DIVISION-MULTIPLEXED RECEIVER ARRAY FOR VERTICAL SEISMIC PROFILING

Carl H. Savit, Houston, Tex., assignor to Western Geophysical Co. of America, Houston, Tex.

Filed Nov. 5, 1984, Ser. No. 668,567

Int. Cl.[4] G01N *29/00*

U.S. Cl. 73—655 **1 Claim**



1. A method of wavelength-division-multiplexing the output signals from a plurality of sensors each of which is located at a different depth within a fluid medium by employing the static pressure head at each sensor to control the wavelength of a carrier signal which is modulated by the transient output of the corresponding sensor.

4,589,286

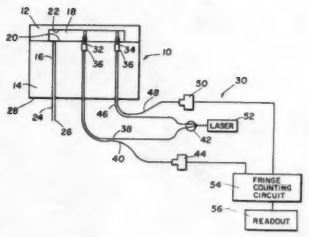
FUSED SILICA DIAPHRAGM MODULE FOR HIGH TEMPERATURE PRESSURE TRANSDUCERS

John W. Berthold, III, Salem, Ohio, assignor to The Babcock & Wilcox Company, New Orleans, La.

Filed Mar. 30, 1984, Ser. No. 595,114

Int. Cl.[4] G01L *7/08*

U.S. Cl. 73—715 **3 Claims**



1. A high temperature pressure transducer comprising a base member, a diaphragm member connected to said base member, said base member and said diaphragm member being formed from a fused silica material, and a gap located between said base member and said diaphragm member allowing the deflection of said diaphragm member in response to variations in the pressure applied thereto wherein said base member and said diaphragm member are molecularly bonded.

4,589,287

STRAIN GAUGE FOR MEDICAL PRESSURE MEASUREMENTS

Duane D. Dickens, San Clemente, Calif., assignor to American Hospital Supply Corporation, Evanston, Ill.

Filed Sep. 17, 1984, Ser. No. 651,283

Int. Cl.[4] G01L *9/06*

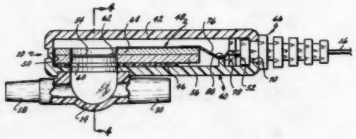
U.S. Cl. 73—727 **11 Claims**

1. A strain gauge for measuring the pressure of biological fluids, comprising:

(a) a non-rigid housing including fluid receiving means, a generally planar support surface, and walls surrounding said support surface;

(b) said support surface having an opening therein communicating with said fluid receiving means;

(c) a closed cell foam pad secured in fluid-tight relationship to said support surface and having an opening therein communicating with said support surface opening; and



(d) a sensor plate secured in fluid-tight relationship to said foam pad in spaced relation to said walls, said sensor plate having a glass diaphragm formed therewith, said glass diaphragm being in communication with said foam pad opening on one side thereof and having a strain gauge element applied thereto on the other side thereof.

4,589,288

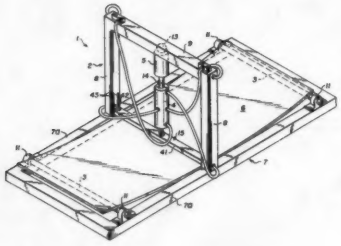
STATIC BENDING APPARATUS FOR GRADING WOOD PANELS

Andrew W. Porter, Richmond, and Lars Bach, Edmonton, both of Canada, assignors to Her Majesty the Queen in right of the Province of Alberta, as represented by the Minister of Energy and Natural Resources, Edmonton, Canada

Filed Feb. 8, 1985, Ser. No. 700,111

Int. Cl.[4] G01N *3/20*

U.S. Cl. 73—852 **6 Claims**



1. An apparatus for non-destructive testing of a reconstituted wood panel, characterized by having a substantially linear relationship between load and deflection when tested to develop a load deflection curve, comprising:

a support frame;

means, associated with the support frame, for bearing against one major surface of the panel along two spaced parallel lines extending substantially across the width of the panel;

means, associated with the support frame, for bearing against the other major surface of the panel along a line extending substantially across the width of the panel between the aforesaid spaced lines of contact;

one of said bearing means being pivotally mounted on said support frame for pivoting in a plane generally perpendicular to the main plane of the panel, whereby it may conform closely with the panel surface to apply a substantially linear and uniform load across substantially the width of the panel;

means for biasing the load-applying bearing means to apply a first load to the panel, said first load being selected to fall on the substantially linear portion of the load deflection curve for the panel, to thereby deflect the panel across its width a first distance; and

means for further biasing the load-applying bearing means to apply an incremental load, also falling on said linear portion, to the panel to thereby further deflect the panel a second distance.

4,589,289

DEVICE FOR TIGHTENING A SCREW FASTENING, ESPECIALLY FOR TIGHTENING IT BEYOND THE YIELD POINT BY CONTROLLING THE ANGLE OF ROTATION

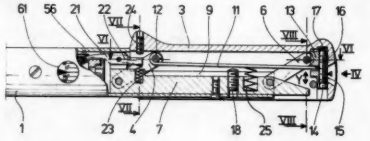
Klaus Neuhaus, Wuppertal, Fed. Rep. of Germany, assignor to Eduard Wille GmbH & Co., Fed. Rep. of Germany

Filed May 16, 1983, Ser. No. 494,789

Claims priority, application Fed. Rep. of Germany, May 18, 1983, 8214536[U]

Int. Cl.[4] B25B *23/142*

U.S. Cl. 73—862.23 **19 Claims**



16. Apparatus for tightening threaded connecting means, comprising:

an elongated housing;

means for engaging said threaded connecting means for rotation about an axis, said engaging means being attached to said housing;

an input member rotatably mounted in said housing about an axis of rotation coaxial with said axis of said engaging means;

holding means for holding said input member against rotation when said housing is rotated;

angle indicating means provided in said housing; and

transmission means for transmitting rotation of said input member, relative to said housing, to said angle indicating device, said transmission means comprising free-wheel means for transmitting rotary motion in one direction only.

4,589,290

TORQUE SENSOR

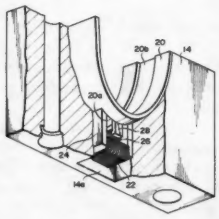
Jun Sugiyama; Yutaka Nonomura; Kouji Tsukada; Keiichi Shimaoka; Masaharu Takeuchi, and Takashi Takeuchi, all of Aichi, Japan, assignors to Kabushiki Kaisha Toyota Chuo Kenkyusho, Aichi, Japan

Filed Dec. 20, 1984, Ser. No. 684,390

Claims priority, application Japan, Dec. 28, 1983, 58-248887

Int. Cl.[4] G01L *3/10*

U.S. Cl. 73—862.36 **13 Claims**



1. A torque sensor comprising an excitation coil wound on

an excitation core and a detection coil wound on a detection core, said coils and cores being inserted into a chamber formed within a bearing for supporting a drive shaft, said chamber having an opening along a sliding surface of said bearing, and the poles of said excitation core being disposed at a prescribed clearance from the surface of the drive shaft and the poles of said detection core being disposed at a prescribed clearance from the surface of the drive shaft in such manner as to intersect said excitation core between the poles thereof at a prescribed angle, thereby detecting variations of drive torque as magnetostriction.

4,589,291

LOAD CELL WITH CENTRALLY LOCATED STRAIN GAUGE

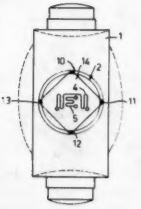
Jörg Sander, Norderstedt, Fed. Rep. of Germany, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 30, 1983, Ser. No. 537,891

Claims priority, application Fed. Rep. of Germany, Oct. 2, 1982, 3236532

Int. Cl.⁴ G01L *1/22*

U.S. Cl. 73—862.65 **2 Claims**



1. A load cell, comprising

a deformable member which is symmetrical about a first axis, and is arranged to be loaded by a force in a direction along said first axis, and

a strain gauge affixed to said member so as to sense deformation resulting from loading by such force,

characterized in that said member has a through bore having a bore axis perpendicular to said first axis, and an annular projection extending into said bore in a plane perpendicular to said bore axis,

the load cell comprises a separate disc-shaped support, having a circumference aligned with and welded to said annular projection at least at a plurality of points which are symmetrically arranged with respect to said first axis,

said annular projection and support are arranged at the center of said bore along said first axis, and

said strain gauge comprises at least one thin film formed on said support by thin-film deposition techniques.

4,589,292

PROCESS AND APPARATUS FOR SAMPLING AMBIENT AIR AT A WORK PLACE

Jean-Noël Delhaye, 20 bis rue Roger Bouvry, 59113 Seclin (Nord), and Elizabeth Kielczewska, 4, Allée des Charmettes, 59650 Villeneuve d'Ascq (Nord), both of France

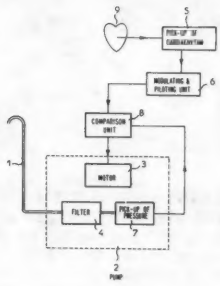
Filed Dec. 5, 1984, Ser. No. 678,241

Int. Cl.⁴ G01N *1/24*

U.S. Cl. 73—863.03 **7 Claims**

1. Process for sampling ambient air at a work place which comprises continually withdrawing by means of a pump, a sample of ambient air in the proximity of the respiratory tract of an individual worker herein after referred to as "said individual", filtering the aspirated air sample with a view to subsequently analyzing the particles filtered out of the air sample and thereby determining particles present in the ambient air,

picking up the cardiac rhythm of said individual, and



controlling the flow of said pump by a signal modulated by the cardiac rhythm of said individual.

4,589,293

EMERGENCY PTO DRIVING UNIT

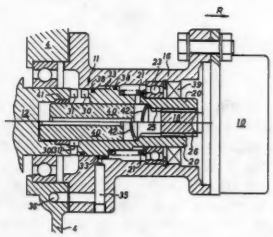
Mituyoshi Mori, Hirakatashi, Japan, assignor to Kabushiki Kaisha Daikin Seisakusho, Japan

Filed Jun. 6, 1984, Ser. No. 617,862

Claims priority, application Japan, Jun. 7, 1983, 58-102284

Int. Cl.⁴ F16H *37/00;* **B62D** *5/00;* **B60K** *17/28, 25/00*

U.S. Cl. 74—15.6 **7 Claims**



1. An emergency PTO driving unit for an industrial machinery vehicle having a hydraulically operated power steering unit supplied with operating hydraulic pressure from an engine-driven hydraulic pump during running of an engine of said vehicle, said emergency PTO driving unit being operable to supply emergency hydraulic pressure to said power steering unit under conditions of traveling of said vehicle with said engine stopped, said emergency PTO driving unit comprising:

a PTO pump having a delivery port connected to supply emergency hydraulic pressure to said power steering unit;

a pump driving shaft for driving said emergency PTO pump and in driven connection with a wheel axle of said vehicle; and

a hydraulically-operated PTO pump clutch unit for selectively mechanically coupling said PTO pump with said pump driving shaft, said PTO pump clutch unit being in communication with said engine-driven hydraulic pump and maintained in a disengaged state by said operating hydraulic pressure supplied from said engine-driven hydraulic pump during running of said engine such that said PTO pump is not driven by said pump driving shaft, said PTO pump clutch having spring means acting in opposition to said operating hydraulic pressure for engaging said PTO pump clutch unit when supplying of said operating hydraulic pressure ceases upon stopping of said engine,

such that said PTO pump is mechanically coupled with said pump driving shaft;

whereby, under traveling of said vehicle with said engine stopped, said PTO pump is driven via said wheel axle to supply said emergency hydraulic pressure to said power steering unit.

4,589,294

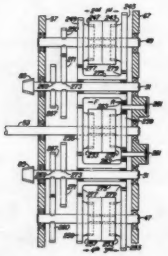
VEHICLE TRANSMISSION WITH A PLURALITY OF FORWARD AND REVERSE SPEEDS

Thomas F. Keenan, 4847 Embassy Ct., and John J. Kass, 1320 Oeth Ct., both of Dubuque, Iowa 52001

Division of Ser. No. 444,922, Nov. 26, 1982, Pat. No. 4,523,655. This application Jul. 20, 1984, Ser. No. 632,913

Int. Cl.[4] F16H *3/08*

U.S. Cl. 74—331 **1 Claim**



1. A low profile transmission comprising: a casing having forward, rear and side walls, said rear wall containing a plurality of ports, an output shaft rotatably mounted in said forward and rear walls of said casing carrying a first and second gear fixably mounted to said output shaft, and a spiral pinion fixably mounted to the end of said output shaft extending forward of said forward wall communicating with said steering drive mechanism; a first gear shaft rotatably mounted in said forward and rear wall off said casing carrying a third gear fixably mounted to said first gear shaft in constant mesh with said first gear, a plurality of fourth gears rotatably mounted to said first gear shaft, first clutching means for selectively coupling one of said fourth gears to said first gear shaft; a second gear shaft rotatably mounted in said forward and rear wall of said casing carrying a fifth gear fixably mounted to said second gear shaft and in constant mesh with said second gear; a plurality of sixth gears rotatably mounted to said second gear shaft; second clutching means for selectively coupling one of sixth gears to said second gear shaft; said output shaft, first gear shaft, and second gear shaft extending generally parallel and coplanar to each other, an input shaft rotatably mounted in said forward and rear walls of said casing carrying a seventh and eighth gear rotatably mounted on said input shaft, means for selectively clutching said seventh and eighth gears to said input shaft; a countershaft having a ninth gear rotatably mounted thereon in constant mesh with said eighth gear, said countershaft being fixably mounted in said casing, said output shaft having a plurality of tenth gears carried on a hub rotatably mounted on said output shaft, each of said tenth gears being in mesh with a respective one of said fourth and sixth gears; one of said tenth gears in constant mesh with said seventh gear and another one of said tenth gears is in constant mesh with said ninth gear; means for communicating said ports with said clutching means.

4,589,295

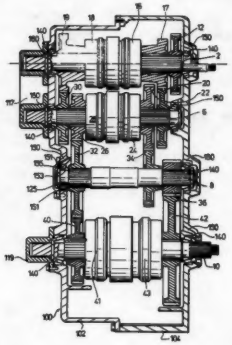
EIGHT SPEED DROP BOX TRANSMISSION

James H. Jerry, and Garry J. VanderEyk, both of Goderich, Canada, assignors to Champion Road Machinery Limited, Goderich, Canada

Filed Jan. 30, 1984, Ser. No. 575,279

Int. Cl.[4] F16H *3/08*

U.S. Cl. 74—360 **24 Claims**



1. A drop box transmission comprising a casing, an input shaft and an output shaft said input shaft and said output shaft being selectively interconnected by a plurality of gears at least some of which are controlled by clutches, said input shaft carrying thereon a high gear and an associated clutch and a low gear and associated clutch, said high and low input gears each meshing with a further gear fixed on a first intermediate shaft, said first intermediate shaft also supporting first intermediate shaft high and low gears each having an associated clutch, a second intermediate shaft located between said first intermediate shaft and said output shaft carrying at least 3 fixed gears on said second intermediate shaft two of which are in mesh with said high and low gears of said first intermediate shaft and two of said at least 3 gears being in mesh with high and low gears on said output shaft with all said at least 3 gears being in mesh with at least one other gear, said high and low gears on said output shaft each being controlled by an associated clutch, said clutches by selective activation of three thereof providing 8 different combinations of gears for driving said output shaft at various speeds relative to said input shaft.

4,589,296

POWER TRANSMISSION MECHANISM

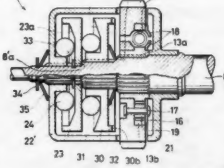
Osamu Sato, Saitama, and Kazuo Yamaguchi, Tokyo, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 444,254, Nov. 23, 1982. This application Jun. 10, 1985, Ser. No. 742,641

Claims priority, application Japan, Dec. 2, 1981, 56-193999

Int. Cl.[4] F16H *57/00, 1/02;* F16D *23/10, 43/24*

U.S. Cl. 74—411 **10 Claims**



1. A system for power transmission of a vehicle comprising:

an internal combustion engine;
a driving wheel of said vehicle connected to said engine;
a transmission mechanism including resilient buffer means and clutch means disposed in a juxtaposed manner relative to said buffer means;
gear power transfer means connected between said engine and one end of said transmission mechanism;
a rotary member;
a shaft connected between the other end of said transmission mechanism and said rotary member, said gear power transfer means always connected between said engine and said transmission mechanism, and said shaft always connected between said power transmission mechanism and said rotary member, said transmission mechanism transmitting rotational force from said engine to said rotary member during rotation of said engine, wherein said clutch means drivingly engages said first gear power transfer means so as to transmit the rotational force at a low range of engine rotation and wherein said clutch means is disengaged from said first gear power transfer means at a predetermined range of engine rotation such that the rotational force is transmitted through said buffer means.

4,589,297

ADJUSTING TRANSMISSION IN A MOTOR VEHICLE

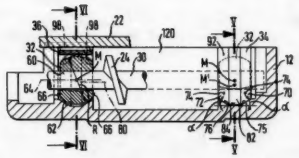
Bernd Mann, Pfarrweisach/Römmelsdorf; Gerhard Schneyer, Grosswalbur, and Emil Dinkel, Coburg, all of Fed. Rep. of Germany, assignors to Brose Fahrzeugteile GmbH & Co. KG, Fed. Rep. of Germany

Filed Jun. 12, 1984, Ser. No. 619,932

Claims priority, application Fed. Rep. of Germany, Jun. 24, 1983, 3322863

Int. Cl.[4] F16H *1/16;* **F16C** *7/00, 11/00, 27/00*

U.S. Cl. 74—427 **29 Claims**



1. An adjustable gear transmission in a motor vehicle comprising

a transmission housing; a transmission element on a rotating shaft which in turn is supported by two shaft bearing means, one located at one side of the transmission element, with the other located at another side of the transmission element; said transmission element, said rotating shaft and said two bearing means being inserted into an open recess in said housing; cover means cooperating with restraining surface means for closing said open recess and for securing said shaft bearing means in said recess; wherein at least one of said two shaft bearing means is essentially ring-shaped with an outer circumferential surface configured as part of a spherical surface; said one bearing means having a first portion of its outer circumferential surface contacting a support means in the recess and a second portion of its outer circumferential surface being pressed against the restraining surface means and wherein each of said support and restraining surface means being formed by at least three prismatic surfaces that are sloped toward the rotating axis of the shaft and armed toward the direction of the center of the spherical surface of said bearing means on two sides of a radial plane of the shaft bearing means extending through the center point of the spherical surface; and wherein the three prismatic surfaces of the support surface means are located on one side of a plane extending through the center point of the spherical surface and the axis of the shaft means and wherein the three prismatic surfaces of the restraining surface means being located on the other side of the plane extending through the center point and axis.

4,589,298

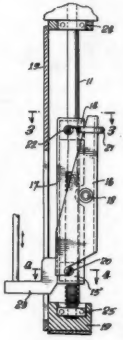
ZERO BACKLASH DRIVE MECHANISM

Richard C. Meyer, La Habra, and Wing S. Pang, West Covina, both of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Jul. 25, 1983, Ser. No. 517,125

Int. Cl.[4] F16H *55/18*

U.S. Cl. 74—441 **6 Claims**



1. A zero backlash driving apparatus comprising:

a shaft including a threaded portion and a smooth portion;
means, connected to said shaft, for rotating said shaft;
a driving member threadably engaged with said threaded portion;
a guide member slidably engaged with said smooth portion;
a force bracket including a first end adjacent said guide member and a second end ajacent said driving member;
means for providing a pivot point on said force bracket intermediate said first and second ends;
means movably supporting said pivot point for providing a force away from said shaft countering the force of said pivot point toward said shaft;
means for resiliently biasing said first end toward said guide member; and
means for transferring force from said second end to said driving member.

4,589,299

REDUCTION MOTOR SHAFT PROVIDED WITH SCREW TYPE DOUBLE

Kyoji Kobayashi, Chigasaki, and Atsushi Inagaki, Zama, both of Japan, assignors to Jidosha Denki Kogyo Kabushiki Kaisha, Kanagawa, Japan

Filed Jun. 22, 1984, Ser. No. 623,300

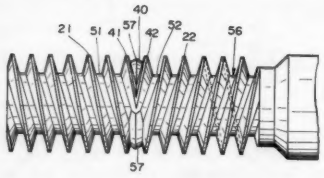
Claims priority, application Japan, Jun. 23, 1983, 58-95729[U]

Int. Cl.[4] F16H *55/17, 55/22, 1/16, 1/20*

U.S. Cl. 74—458 **3 Claims**

1. A reduction motor shaft comprising first and second multiple start worm screw portions having threads of opposite hand disposed adjacent each other at one end of the shaft with

the threads of both worm screw portions being linked with each other at the boundary between said worm screw portions



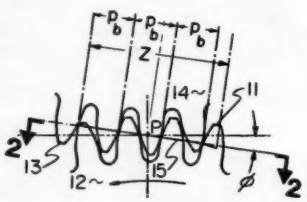
and an annular protrusion disposed at said boundary with said linked threads intersecting said annular protrusion.

4,589,300

LOW TRANSMISSION ERROR GEARING

William S. Rouverol, 1331 Arch St., Berkeley, Calif. 94708

Filed Aug. 17, 1984, Ser. No. 641,701
Int. Cl.⁴ F16H *55/06, 55/08*
U.S. Cl. 74—462 **12 Claims**



1. A pair of mating gears having axes that are coplanar and teeth that are formed to make contact along lines that (a) lie within a field of contact and (b) are slantingly disposed with respect to the common pitch element of said pair,

said field of contact having a first pair of sides spaced apart by the maximum length of the path of contact of said pair of gears, and a second pair of sides spaced apart by the active face width of said pair of gears,

said lines of contact extending from one of said sides to another of said sides when said pair of gears is transmitting full torque, thereby affording two directional contact ratios consisting of a profile contact ratio in the transverse direction and a face contact ratio in the axial direction, one of said two directional contact ratios being substantially an integer

the whole depth of the teeth on one of said pair of gears being at least 2.8 modules.

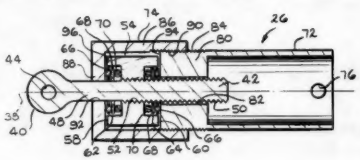
4,589,301

LINEARLY INFINITELY VARIABLE MECHANISM

Glenn C. Griner, Ann Arbor, Mich., assignor to Hoover Universal, Inc., Ann Arbor, Mich.

Filed Apr. 27, 1983, Ser. No. 488,963
Int. Cl.⁴ F16H *25/20*
U.S. Cl. 74—586 **18 Claims**

1. In apparatus having relatively positionable member, a linearly infinitely variable mechanism for positioning said relatively positionable members, said linearly infinitely variable mechanism having an effective length along a linear axis thereof which is infinitely variable over a given linear range, said linear infinitely variable mechanism comprising first and second portions which are relatively positionable along said axis to cooperatively establish the effective length of said linearly infinitely variable mechanism, means mounting said first and second portions of said linearly infinitely variable mechanism on said apparatus to preclude their rotation relative to each other about said linear axis, and means operatively coupling said first and second portions of said linearly infinitely variable mechanism comprising an annular element concentric with said axis and means axially capturing said element on said second portion of said linearly infinitely variable mechanism, said means axially capturing said element comprising capturing portions which are relatively adjustable to one condition permitting said element to rotate about said axis relative to said first and second portions of said linearly infinitely variable mechanism and to another condition preventing such rotation, said element and said first portion of said linearly infinitely variable mechanism comprising an operative connection between then which is effective, when said capturing portions are in said one condition and axial forces are concurrently applied to said linearly infinitely variable mechanism to urge a change in the length thereof, to initiate rotation of said element about said axis relative to said first and second portions of said linearly infinitely variable mechanism, and said rotation of said element is in turn effective to permit translation of said first portion relative to both said element and said second portion thereby to change effective length of said



mechanism, said element having transverse and faces at opposite axial ends thereof, and said capturing portions being disposed in confronting juxtaposition to said end faces and operable in said another condition to apply axial capturing frictional forces against both said end faces great enough to prevent said element from rotating with respect to said first and second portions of said linearly infinitely variable mechanism in response to axially applied forces tending to change the effective length thereof, said linearly infinitely variable mechanism comprising means defining a recess between one of said transverse end faces of said element and a corresponding juxtaposed confronting capturing portion of said axially capturing means and means disposed within said recess including bearing means and yieldable resilient means, said bearing means being urged by said yieldable resilient means to provide bearing support to promote free rotation of said element with respect to said second portion of said linearly infinitely variable mechanism when said capturing portions are in said one condition, said yieldable resilient means yielding when said capturing portions are in said another condition so as to allow said bearing means to be disposed more fully into said recess.

4,589,302

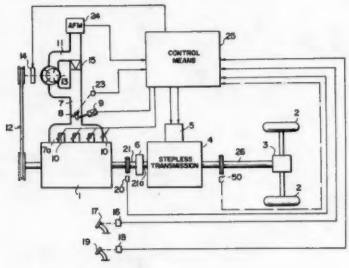
CONTROL SYSTEM FOR AN AUTOMOTIVE DRIVING SYSTEM INCLUDING AN ENGINE THROTTLE VALVE AND A STEPLESS TRANSMISSION

Hiroyuki Oda, Hiroshima; Katsuhiko Yokooku, Saka; Nobuhide Seo, and Hideo Shiraishi, both of Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Japan

Filed Apr. 23, 1984, Ser. No. 602,964
Claims priority, application Japan, Apr. 26, 1983, 58-73225
Int. Cl.⁴ B60K *41/12, 41/18*
U.S. Cl. 74—866 **11 Claims**

1. An automotive driving control system comprising a stepless transmission provided between an engine and driving wheels, a transimssion control means for controlling the transmission ratio of the stepless transmission, a throttle valve disposed in the intake passage of the engine, a throttle valve driving means for driving the throttle valve to control the opening degree thereof, first detecting means for detecting the

amount of operation of the accelerator, second detecting means for detecting acceleration requirement, and a control means which receives the outputs of the first and second detecting means to control the transmission control means and the throttle valve driving means to respectively control the transmission ratio of the stepless transmission and the opening degree of the throttle vavlve so that the engine output requirement as represented by the amount of operation of the accelerator is satisfied and control at least one of the transmission control means and the throttle valve driving means so that engine output corresponding to the amount of operation of the accelerator is obtained when the acceleration requirement is smaller than a predetermined value and maximum engine output is obtained when the acceleration requirement is larger than the predetermined value wherein acceleration requirement greater than said predetermined value corresponds to an abrupt acceleration of an automobile.

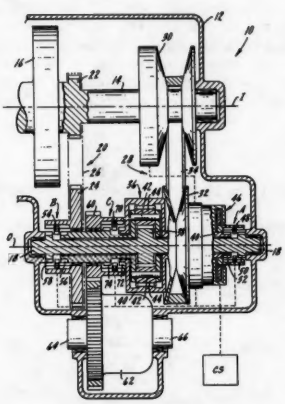


4,589,303

CONTINUOUSLY VARIABLE TRANSMISSION WITH SYNCHRONOUS SHIFT

Richard W. Roberts, Lombard, Ill., assignor to Borg-Warner Corporation, Chicago, Ill.

Filed Aug. 24, 1984, Ser. No. 643,938
Int. Cl.[4] F16H *37/00*
U.S. Cl. 74—689 **12 Claims**



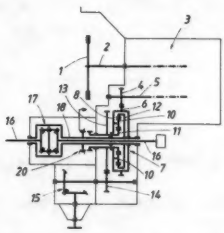
5. A continuously variable transmission with synchronous shift comprising a rotatable drive shaft, a fixed-ratio drive mechanism including drive and driven elements, said drive element being rotatable in response to rotation of said drive shaft, a variator having a ratio range that is continuously variable between predetermined limits, said variator including variable drive and driven pulleys, said drive pulley being rotatable in response to rotation of said drive shaft, a planetary gear assembly including a sun gear member, a ring gear member, a carrier member, and a plurality of planet gears supported by said carrier member in meshing relationship with said sun and ring gear members, a rotatable output, first clutch means for engaging said driven pulley selectively with two of said members, second clutch means for engaging said driven element selectively with two of said members and for disengaging said driven element therefrom, and third clutch means for engaging two of said members selectively with said output, said transmission being constructed and arranged such that said driven element, driven pulley, members, and output rotate in synchronism when the ratio of said variator is substantially equal to the ratio of said fixed-ratio drive mechanism.

4,589,304

DRIVING GEAR INTERAXLE DIFFERENTIAL ASSEMBLY FOR ALL-WHEEL-DRIVE VEHICLES

Noboru Ashikawa, Sayama, Japan; Karl Friedrich, Leibnitz, and Heribert Lanzer, Gössendorf, both of Austria, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 4, 1984, Ser. No. 657,543
Claims priority, application Japan, Oct. 5, 1983, 58-186089
Int. Cl.[4] F16H *37/08, 1/42*
U.S. Cl. 74—701 **2 Claims**



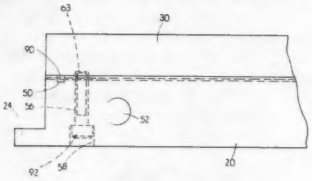
1. A driving gear for all-wheel-drive vehicles, comprising a reduction gear meshed with an output gear in a transmission, a planetary gear type interaxle differential gear arranged concentrically with said reduction gear so as to output the driving force therefrom into front and rear interwheel differential gears in a divided manner, a driving shaft provided through and concentrically with said interaxle differential gear so as to transmit one output therefrom to one of said two interwheel differential gears, and a driving gear member mounted on said driving shaft so that said driving gear member can be rotated relatively thereto, so as to transmit the other output from said interaxle differential gear to the other interwheel differential gear, said interaxle differential gear consisting of a planetary carrier mounted rotatably on said driving shaft on the side of said driving gear member so as to form a clearance between said planetary carrier and said driving shaft, a support member mounted rotatably on said driving shaft so as to be opposed to said planetary carrier, and a ring gear, pinions and a sun gear which are provided between said planetary carrier and said support member, a connecting member which joins said ring gear and said driving shaft together being provided between said pinions and said support member, said driving shaft being provided with a spline for joining said connecting member thereto, said driving gear member being provided with a hub formed integrally therewith, extending from said clearance into said interaxle differential gear and having a connecting portion joined to said sun gear, said reduction gear being formed unitarily with said planetary carrier and said support member.

4,589,305

COMPOSITE TOOTH-FORMING RACK AND METHOD FOR MAKING SAME

Wallace C. Grace, 825 Laurier Dr., LaSalle, Ontario, Canada (N9I 1M9), and Walter P. Boychuk, 2930 Orion Cr., Windsor, Ontario, Canada (N9E 2Z4)

Filed Dec. 5, 1983, Ser. No. 558,133
Int. Cl.[4] B21K *5/20*
U.S. Cl. 76—107 R 13 Claims



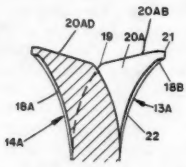
1. A composite tool rack useful for pressure-forming a workpart, comprising a base and a tool insert made of a material heat-treatable to high hardness by solution annealing followed by tempering at a substantially lower temperature and attached to the base by a metallurgical bonding agent having a melting temperature substantially lower than the solution annealing temperature of the insert and above the tempering temperature thereof, whereby the insert is bonded to the base during the hardening heat treatment.

4,589,306

SAW AND METHOD FOR THE MANUFACTURE THEREOF

Mats Danielsson, Sandviken, Sweden, assignor to Santrade Ltd., Lucerne, Switzerland

Filed Feb. 7, 1984, Ser. No. 578,367
Claims priority, application Sweden, Feb. 7, 1983, 8300611
Int. Cl.[4] B23D *63/00*
U.S. Cl. 76—112 10 Claims



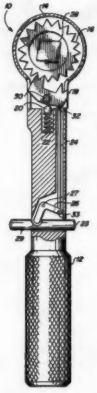
1. A method of manufacturing a saw of the type comprising a series of generally V-shaped cutting teeth, with at least a leading edge of each tooth comprising a beveled cutting edge, the method comprising the steps of passing punching tools through a metal blank to form successively arranged teeth each having leading and trailing edges; the tools forming the leding edges of the teeth each having a surface oriented non-perpendicularly relative to the plane of the blank to form a bevel along each leading edge; the leading edges on successive ones of the teeth being formed by directing the respective tools against opposite sides of the blank so that the bevels of successively arranged leading edges are located on opposite sides of the blank; a burr being formed along each cutting edge in response to passage of the tool through the blank and being retained thereon as part of such cutting edge.

4,589,307

PUSH BUTTON REVERSIBLE RATCHET WRENCH

David L. Parker, Amado, Ariz., assignor to Bob Barber, Jr., Tucson, Ariz., a part interest

Filed Sep. 13, 1984, Ser. No. 650,259
Int. Cl.[4] B25B *13/46*
U.S. Cl. 81—62 11 Claims



1. An improvement in reversible ratchet wrenches of the type having in its upper portion a ratchet wheel attached to a square shaped stud adapted to receive a socket, a double ended ratchet reversing pivotal pawl adapted to pivot and engage the ratchet wheel with one end or the other and thereby effect a reversal, a mid-section shank portion connecting to the upper portion, and a handle to be held by the operator's hand, said handle connecting to the mid-section portion, the improvement comprising:

a movable extension control rod having a first and second end, said first end operably attached to the pivotal pawl,

a direction reversing push-button assembly penetrating transversely the mid-section shank portion proximate the handle, and

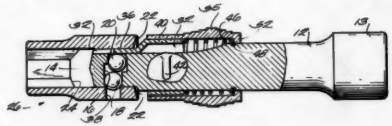
a pivotal cam having a first and second end, said pivotal cam operably attached at said first end to said extension control rod second end and said pivotal cam second end engaging said push-button assembly where by pushing said push-button pivots said pivotal cam and thereby moves said extension control rod to pivot the double ended pawl to effect a reversal of the ratchet direction.

4,589,308

SOCKET WRENCH EXTENSION

Bernhard Palm, 17420 Continental Dr., Brookfield, Wis. 53005

Filed Mar. 4, 1985, Ser. No. 707,737
The portion of the term of this patent subsequent to Aug. 27, 2002, has been disclaimed.
Int. Cl.[4] B25B *23/16;* B25G *1/04*
U.S. Cl. 81—177.85 5 Claims



1. A socket wrench extension having a cylindrical body with a square drive end and provided with a push-on/quick release locking arrangement comprising,

a transverse bore through said drive end intersecting opposed flat faces,

lock means mounted in said bore for movement between a lock position in which one end of the lock means projects from one end of the bore and a release position in which the lock means lies within the cross section of the drive end,

said one end of said bore being closer to the end of said drive end than is the other end of said bore,

an axial groove in the flat face intersected by said other end of said bore,

a cylindrical grip sleeve member mounted for slideable movement on said cylindrical body of said extension, said sleeve member having a substantially uniform bore and the end of said sleeve member remote from said drive end being turned inwardly,

a cylindrical slider member fixed in the end of said sleeve member which is closer to said drive end,

means axially fixing said slider member in said sleeve member,

a groove in said cylindrical body,

a spring having a coil captured in said groove and compressed to bear against said slider member to bias said slider member and sleeve member towards said drive end,

and a lock tab projecting from said slider member into said groove to overlie said lock means when said inturned end of said sleeve member abuts said coil.

4,589,309

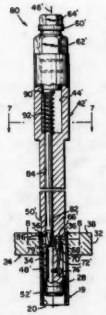
PRECISION INTERNAL TUBE CUTTER

Nick Nokovich, Greensburg, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Continuation-in-part of Ser. No. 649,046, Sep. 10, 1984, abandoned, which is a division of Ser. No. 544,166, Oct. 21, 1983, abandoned. This application Sep. 12, 1984, Ser. No. 649,864

Int. Cl.⁴ B23D *21/08, 21/14*

U.S. Cl. 82—1.2 **11 Claims**



1. For use in facilitating reconstitution of a fuel assembly including a top nozzle having an adapter plate with a plurality of passageways defined through the adapter plate and a plurality of guide thimbles with hollow upper end portions inserted in the passageways and attached to the top nozzle adapter plate at the upper ends of the passageways, a precision internal tube cutter for severing the upper end portion of the guide thimble just below its region of attachment to the top nozzle adapter plate, comprising:

(a) an elongated body having an upper end portion, a lower end portion, an intermediate portion interconnecting said upper and lower end portions, and a longitudinal bore defined in said body so as to extend axially offset through said upper end portion and into at least said intermediate portion of said body;

(b) said upper and lower end portions of said body being of generally cylindrical cross-sectional shapes and having respective diameter sizes which adapt them to closely fit within and make guiding contact with the hollow upper end portion of one of the guide thimbles inserted and attached within one of the passageways of the top nozzle adapter plate;

(c) said intermediate portion of said body being of a cross-sectional shape reduced in size relative to the respective diameter sizes of said upper and lower end portions which prevents it from making contact with the hollow upper end portion of the guide thimble, said intermediate portion having a radially extending slot formed therein which intersects said offset longitudinal bore;

(d) a pin disposed within said offset longitudinal bore and having a portion extending into said radial slot, said pin being movable axially along said bore between an upper retracted position and a lower extended position;

(e) a slide mounted within said slot and having an inner end disposed adjacent and in contact with said pin portion, said slide being movable radially between outward and inward positions;

(f) means defined on said pin portion for converting axial movement of said pin between its retracted and extended positions within said offset lower portion of said longitudinal bore into radial movement of said slide between its respective inward and outward positions;

(g) operable means interconnecting said elongated body and said pin such that upon operation of said operable means said pin is actuated to move axially along said offset bore between its retracted and extended positions;

(h) a cutting wheel rotatably mounted on said slide so as to define a cutting plane upon rotation of said body within the hollow upper end portion of the guide thimble, said cutting wheel being disposed in an outwardly advancing cutting position which progressively severs the upper end portion of the guide thimble within said cutting plane as said slide is moved from its inward to outward positions when said pin is moved by said operable means from said retracted to extended positions and said cutter body is rotated, said cutting wheel being disposed in its inward position when said slide is disposed in its inward position which facilitates insertion and withdrawal of said cutter body into and from the guide thimble; and

(i) means mounted on said intermediate body portion and connected to said slide for normally biasing said slide towards its inward position so as to maintain it in contact with said pin portion.

(j) means on said upper body portion for rotating said tube cutter

---

4,589,310

CHUCK AND ROTARY TOOL TO BE USED WHEN MAKING A HOLE IN A WORKPIECE

Harald P. G. Neumann, Julita, Sweden, assignor to Tryckluftteknik Harald Neumann AB, Julita, Sweden

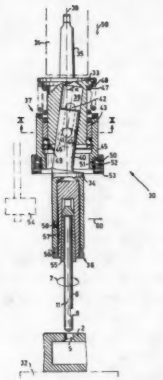
Continuation of Ser. No. 304,551, Sep. 21, 1981, abandoned. This application Nov. 16, 1984, Ser. No. 674,341

Int. Cl.⁴ B23B *41/06*

U.S. Cl. 82—1.4 **5 Claims**

1. A chuck for use in machining a workpiece in which the first member of two members incorporated in the chuck is provided with a guide recess for a guide shank on the second member, axially displaceable in the guide recess and at an angle to the rotational axis of the chuck, said second member having a holder for a rotary tool and being coupled to a contact means by means of which it can be arrested in a predetermined axial position relative the workpiece which is to be machined, for causing at an axial displacement of the first member a radial displacement outwards of the holder, characterized in that the second member is lockable relative the first member by means of a locking means in a normal position for boring, where the centreline of a rotary tool in the holder coincides with the

rotational axis of the chuck, and that the locking means is resettable by means of the contact means to a position out of



engagement where relative displacement between the first member and the second member is possible.

4,589,311

AUTOMATIC TURRET LATHE

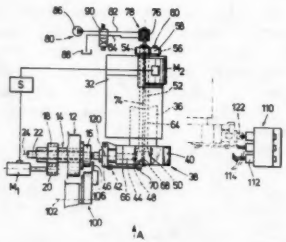
Helmut F. Link, Aichwald, and Walter Grossmann, Baltmannsweiler, both of Fed. Rep. of Germany, assignors to Index Werke Komm.-Ges Hahn & Tessky, Esslingen, Fed. Rep. of Germany

Filed Nov. 4, 1983, Ser. No. 549,346

Claims priority, application Fed. Rep. of Germany, May 4, 1983, 3316288

Int. Cl.[4] B23B *29/32, 13/04*

U.S. Cl. 82—2.5 **3 Claims**



1. An automatic turret lathe comprising a main rotatable spindle; means for rotatably mounting said spindle for rotation about a main spindle axis; drive means associated with said main spindle for rotatably driving the same about said main axis; a first workpiece chuck means associated with said main spindle and rotatable therewith; a first tool carrier comprising a tool turret rotatably mounted about an indexing axis; a second workpiece chuck means mounted on the first tool carrier turret for rotation about an auxiliary spindle axis; a second tool carrier for machining a workpiece held by said first chuck means located adjacent the latter for movement relative to a workpiece held by the first chuck means; a stationary third tool carrier disposed on the side of said first tool carrier facing away from said first chuck means; said third tool carrier carrying a plurality of tool holders; and cross slide means on which said first tool carrier is rotatably mounted for movement of said turret along axes normal and parallel to said main spindle axis so that by appropriate adjustment of said slide means and appropriate indexing of said tool turret said auxiliary spindle axis can be brought into axial alignment with said main spindle axis and a workpiece held by said second chuck means may approach each of said tool holders of the third tool carrier.

4,589,312

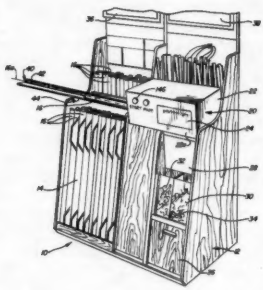
AUTOMATIC SHADE CUTTER

Frederick C. Meyers, Hinsdale, and David B. Mann, Clarendon Hills, both of Ill., assignors to Joanna Western Mills Company, Chicago, Ill.

Filed Feb. 22, 1984, Ser. No. 582,463

Int. Cl.[4] B23B *3/26, 5/14*

U.S. Cl. 82—47 **22 Claims**



1. Apparatus for automatically cutting off elongated, rolled-up window shades to a particular width, comprising:

base means for supporting operative working components of said apparatus at a convenient working level;

clamping means supported from said base means for securing a shade in a cutting position on one side of a transverse cut-off plane along a longitudinal axis ready for cut-off;

measuring means including a measuring scale extending along said axis for use in selecting a cutting position of said shade for cutting to said particular width;

cutting head means supported from said base means adjacent said clamping means and rotatable about said axis including knife means rotatively movable on a plane normal to said axis between a first position radially outwardly of said shade and a second position inwardly thereof for cutting engagement with said shade while said shade is secured in said selected cutting position along said axis,

said cutting head means including means for biasing said knife means toward said first positon and means responsive to rotation of said cutting head means fo moving said knife means into said second position for cutting said shade to said particular width;

drive means supported from said base means for rotatively driving said cutting head means when energized;

operator means for moving said clamping means between a clamping position for securing said shade in a clamping position while said drive means is energized to cut said shade and a release position permitting longitudinal withdrawal of said shade out of cutting position;

trough means extending outwardly from said cutting head means on said one side of said cut-off plane along said longitudinal axis and adjacent said measuring scale for supporting a shade during measurement and before and after cut-off when said clamping means is in said release position,

removable cover means normally enclosing said clamping means and said cutting head means during operation and including an opening aligned with said trough means for receiving an end portion of shade inserted therein to be cut-off by said cutting head;

automatic control means for (1) activating said operator means to move said clamping means from said release

position toward said clamping position after measuring said shade along said measuring means and placement thereof in a selected cutting position along said axis, (2) energizing said drive means to drivingly rotate said cutting means to cut-off said shade while said clamping means is in said clamping position securing said shade in said selected cutting position, (3) deenergizing said drive means after said shade is cut-off, and (4) thereafter activating said operator means to move said clamping means to said release position permitting said cut-off shade to be withdrawn from said apparatus; and

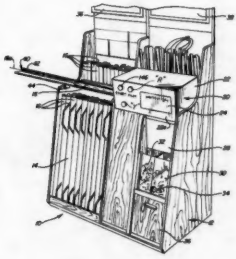
push button means for enabling a consumer to activate said automatic control means to cut-off said shade to the desired width.

4,589,313

AUTOMATIC SHADE CUTTER

Frederick C. Meyers, Hinsdale, and David B. Mann, Clarendon Hills, both of Ill., assignors to Joanna Western Mills Company, Chicago, Ill.

Filed May 30, 1985, Ser. No. 739,606
Int. Cl.[4] B23B *3/26, 5/14*
U.S. Cl. 82—63 **10 Claims**



1. Apparatus for automatically cutting elongated articles such as rolled up window shades to a particular width, comprising:

base means supporting operative components of said apparatus at a convenient working level;

clamping means supported from said base means for securing said article in position along a longitudinal axis for cutting;

measuring means extending along said axis outwardly from said clamping means for use in selecting a cutting position of said article for cutting to said particular width;

cutting head means supported from said base means adjacent said clamping means rotatable about said axis including circular knife means rotatably mounted thereon and movable on a plane normal to said axis between a first position outwardly of said article and a second position radially inwardly thereof for cutting engagement with said article while said article is secured in said selected cutting position along said axis,

said cutting head means including first means biasing said knife means toward said first position, second means responsive to rotation of said cutting head means for moving said knife means into said second position for cutting said article to said particular width, and third means restraining rotation of said knife means relative to said cutting head means in one direction and permitting free rotation in an opposite direction upon cutting contact with a peripheral cutting edge of said knife means and said article that is secured in said selected cutting position;

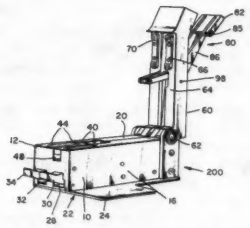
and drive means supported from said base means rotatively driving said cutting head means when energized to orbit said knife means around said article secured in said selected cutting position.

4,589,314

FILM CUTTER

Brian Ralph, 320 S. Beachwood Dr., Burbank, Calif. 91506, and Martin Mueller, Couer d'Alene, Id., assignors to Brian Ralph, Burbank, Calif.

Filed May 28, 1985, Ser. No. 737,712
Int. Cl.[4] B26D *5/42, 7/02*
U.S. Cl. 83—144 **1 Claim**



1. A film Cutter comprising:

a. a hollow base member including a front wall, a first side wall, a rear side wall, a second side wall, a top and a bottom;

b. the front wall of said base member containing a first opening and a second opening located in spaced parallel relationship to each other;

c. said first opening accommodating a first finger pedal;

d. said second opening accommodating a second finger pedal;

e. said first and second finger pedals being rotatably supported to permit downward movement of each finger pedal within its opening;

f. the top of said base member containing a first fixed pair of pins spaced apart by the widthwise mid-point distance between sprocket holes on a length of motion picture film;

g. the top of said base member further containing a second fixed pair of register pins spaced apart by the widthwise mid-point distance between sprocket holes on a length of motion picture film;

h. said first and second pairs of register pins spaced part from each other in generally parallel relationship;

i. a first movable film ejection plate surrounding said first pair of register pins and supported on the base member such that its surface is parallel to the top of the base member;

j. a second movable film ejection plate surrounding said second pair of register pins and supported on the base member such that its surface is parallel to the top of the base member;

k. connecting means between said first movable film ejection plate and said first finger pedal such that the first movable film ejection plate moves upwardly away from the base member when the first finger pedal is depressed;

l. connecting means between said second movable film ejection plate and said second finger pedal such that the second movable film ejection plate moves upwardly away from the base member when the second finger pedal is depressed;

m. the top of said base member containing a longitudinal opening between the first and second movable film ejection plates;

n. a movable film support plate located within said longitudinal opening between the first and second movable film ejection plates with its upper surface parallel to the top of the base member;

o. a spring supporting the movable film support plate within the longitudinal opening;

p. a second opening in the top of the base member located to the rear of the movable film support plate;

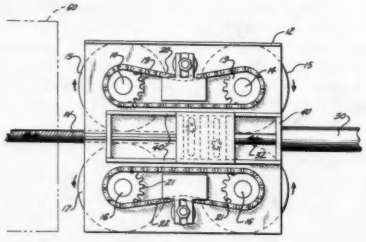
q. a movable knife support lever rotatably supported on a shaft at the rear of the base member and located at generally a right angle to the base member in its at rest position;
r. the front face of the movable knife support lever containing a first film seating plate with a pair of openings such that the first film seating plate is aligned with the first film ejection plate and the openings accommodate the first pair of register pins when the movable knife support lever is rotated into parallel relationship with the top of the base member;
s. the front face of the movable knife support lever containing a second film seating plate with a pair of openings such that the second film seating plate is aligned with the second film ejection plate and the openings accommodate the second pair of register pins when the movable knife support lever is rotated into parallel relationship with the top of the base member;
t. the movable knife support lever further comprising a centrally disposed longitudinal opening which accommodates a movable knife actuating assembly;
u. said movable knife actuating assembly comprising a handle member extending into a pair of spaced parallel handle arms joined at their forward end by a shaft, the pair of handle arms pivotally and rotatably supported on a first longitudinal arm and a second longitudinal arm which are in turn pivotally and rotatably supported on said movable knife support lever;
v. the upper front edge of the first longitudinal arm containing the film cutting knife which is aligned with the movable film support plate when the movable knife support lever is brought into parallel relationship with the top of the base member and the handle member is activated and pressed toward the movable knife support lever;
w. the interior hollow portion of the base member containing a fixed transverse beam which contains a hook and whose upper portion extends into the second opening in the top of the base member;
x. an internal lever arm pivotally supported by a shaft on said fixed transverse beam and extending within the base member such that its rear portion abuts the lower portion of the second longitudinal arm and its forward portion is in contact with the lower portion of the first and second finger pedals; and
y. a spring interconnecting the shaft which supports the internal lever arm and the lower portion of the first longitudinal arm.

4,589,315

WIRE ROPE SALVAGING APPARATUS

Kenward J. Clement, 1230 Fig St., Morgan City, La. 70380

Filed Dec. 8, 1983, Ser. No. 559,400
Int. Cl.[4] B26D *5/20*
U.S. Cl. 83—202 **9 Claims**



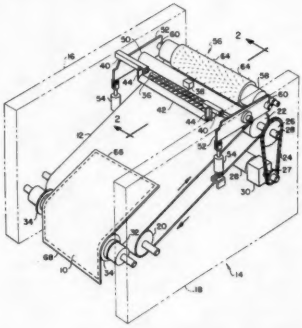
1. A wire rope salvaging apparatus comprising:
a. a frame;
b. a plurality of cable engaging wheels rotatably mounted on the frame;
c. cylinder means mounted on the frame and including an extensible pushrod movable between retracted and extended positions; and
d. drive means carried at least in part by the pushrod for rotating one or more of the wheels responsive to movement of the pushrod so that when the pushrod is moved between the extended and retracted positions, a length of wire rope is responsively advanced by the wheels, and wherein the drive means comprises a pair of opposed endless chains and a corresponding pair of chain engaging means carried by the pushrods so that the rope is advanced responsive to movement of the chains; and
e. cutting means carried by the frame for cutting the length of wire rope after it has been advanced.

4,589,316

MACHINE TO PRODUCE MAT WITH VALVES THEREIN

Aage Lang, Kolind, Denmark, assignor to Clean-Tex A/S, Morke, Denmark

Filed Jan. 28, 1985, Ser. No. 695,683
Int. Cl.[4] B23D *25/12;* **B23B** *3/02*
U.S. Cl. 83—289 **4 Claims**



1. Machine to provide a plurality of valve-like perforations in the rubber-like backing of a nap mat or carpet comprising: a frame including a pair of spaced apart support members, an endless conveyor belt supported between said support members by a pair of spaced apart rolls, drive means operably associated with one said roll to rotate said endless conveyor, a perforating roll with pins on the outer surface thereof operably associated with one of said spaced apart rolls and means operably associated with said perforating roll to pivot said perforating roll into and out of close proximity to the spaced apart roll to which it is operably associated to provide valve-like openings in the rubber-like backing material of a nap mat or carpet on said endless conveyor, said means to pivot said perforating roll includes a reflective strip mounted across said endless conveyor belt and a photo-electric eye cooperating therewith.

4,589,317

SHEET OR PLATE MATERIAL MACHINING EQUIPMENT

Susumu Kawano, La Habra, Calif., assignor to U.S. Amada Limited, Buena Park, Calif.

Filed Dec. 30, 1983, Ser. No. 567,375
Int. Cl.[4] B26D *7/02*
U.S. Cl. 83—400 **7 Claims**

1. Apparatus for machining sheet material, comprising:
operating tools for machining a sheet material;
a work table movable along a first axis for moving the sheet material with respect to said operating tools;
carriage means mounted on said work table and movable along a second axis perpendicular to said first axis;

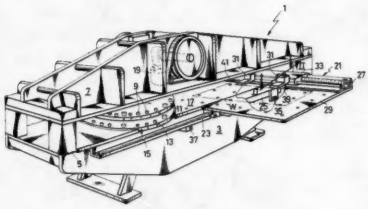
work clamp means mounted on said carriage for holding and positioning the sheet material;

upper and lower jaws extending horizontally from said work clamp means for clamping the sheet material therebetween;

first detector means mounted at a predetermined position along said first axis with respect to said operating tools;

first actuating means carried by said movable table for actuating said first detector means when moved along said first axis into proximity therewith;

second detector means mounted at a predetermined position along said second axis with respect to said operating tools;



second actuating means carried by said carriage means for actuating said second detector means when moved along said second axis into proximity therewith;

said first and second detector means being positioned with respect to one another along said respective first and second axis as to define a danger zone in the vicinity of said operating tools when said axes intersect at a predetermined point; and

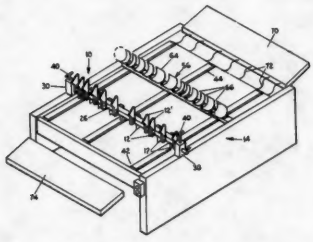
means for releasing said upper and lower jaws from clamping engagement with the sheet material and for rotatably retracting said jaws out of said danger zone in response to the simultaneous actuation of both said first and second detector means.

4,589,318

MEAT ROLL CUTTING MACHINE

Richard O. Kanski, Grand Rapids, Mich., assignor to Frederick & Herrud, Inc., Detroit, Mich.

Filed Jan. 30, 1985, Ser. No. 696,636
Int. Cl.[4] B26D *3/16*
U.S. Cl. 83—409.1 **20 Claims**



1. A meat cutting device for cutting long rolls of soft meat into shorter chunks, comprising:

(a) conveying means for continuously conveying rolls of meat one after the other along a path;

(b) a plurality of parallel stationary blades disposed spacedly from one another across said path;

(c) each of said blades having a sharp point formed between two adjacent sharpened edges normal to said path, said point being disposed to contact and pierce a roll of meat conveyed along said path before said edges make substantial contact with the roll;

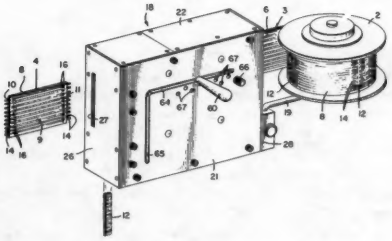
whereby as a roll is conveyed into each blade, said point will pierce through the skin of said roll and said one edge will slice through the roll and skin on one side of said point and said other edge will slice through the roll and skin on the other side of said point.

4,589,319

APPARATUS FOR DISPENSING FLAT CABLE ASSEMBLIES

Melvin P. Litehizer, Jr., Winston-Salem, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Dec. 7, 1984, Ser. No. 679,652
Int. Cl.[4] B26D *5/20*
U.S. Cl. 83—423 **6 Claims**



1. Apparatus for severing individual jumper cable assemblies from a continuous strip thereof, the strip comprising a flat flexible cable having a plurality of continuous parallel conductors between dielectric lamina which define first and second sides of the cable, each jumper cable assembly having a leading end, a trailing end, and a row of terminals crimped to respective conductors in the cable proximate each end, each terminal lying against the first side of the cable and having crimp tines which penetrate the cable and extend through the second side thereof, the trailing end of each assembly being adjacent the leading end of the next assembly and separated therefrom by an intermediate portion of cable, the apparatus comprising

a slot-like guide for guiding the continuous strip in a feed path therethrough from a first end to a second end thereof, the guide comprising parallel first and second substantially planar surfaces, said first surface having a plurality of parallel ridges defining a plurality of parallel channels therebetween, said channels being spaced as terminals in one of said rows and profiled to receive respective terminals of said row therein, said second surface facing said first surface and being spaced sufficiently closely thereto to contain said terminals in said channels and thus prevent lateral shifting of said cable in said slot, one of said surfaces having elongate aperture means therein which parallels the feed path of said cable,

linearly reciprocable pawl means for engaging said terminals through said aperture means and moving a cable assembly from said first end toward said second end,

anti-back-up means to prevent back up of said cable when said pawl returns from said second end to said first end,

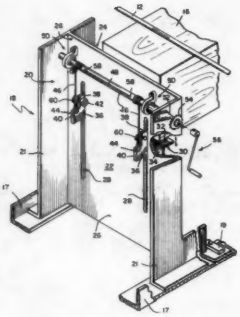
severing means adjacent the second end of said slot and movable laterally across the feed path on the second side of said cable to sever an intermediate portion from said strip and thus isolate a jumper cable assembly.

4,589,320

LOG LIFTING AND SUPPORT APPARATUS

Paul G. Kaster, Shelbyville, Ind., assignor to Kasco Mfg. Co., Inc., Shelbyville, Ind.

Filed Jan. 18, 1985, Ser. No. 692,558
Int. Cl.[4] B27B *15/02*
U.S. Cl. 83—794 **16 Claims**



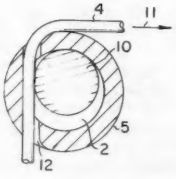
1. In a bandsaw-type sawmill for slicing planks from a log and including a bandsaw blade with a horizontally extending run and means for mounting the blade for longitudinal movement along and above a log, means for raising the log in incremental amounts to be engaged by the blade run to cut planks from the top of the log, said log raising means including, at each end of the log, a platform upon which the log rests, means for supporting the platform for vertical movement comprising a support panel having a log proximal and a log distal side, said platform having a log receiving surface and surfaces for engaging both the log proximal and log distal sides of the support panel, and means for lifting the platform, the lifting means including, rotary means, rotary driving means, ratchet and pawl means for indexing incremental steps of rotational movement of the rotary means, and means for connecting the rotary means to the platform so that the platform is lifted in steps when the rotary means is rotated in steps.

4,589,321

STRING ATTACHMENT MEANS FOR A TUNING MACHINE

Eric K. Pritchard, Bowie, Md., assignor to Paul Reed Smith, Annapolis, Md.

Filed Jun. 25, 1984, Ser. No. 624,341
Int. Cl.[4] G10D *3/12*
U.S. Cl. 84—297 R **15 Claims**



1. A string attachment device for a stringed musical instrument comprising:

a shaft, a portion of the exterior surface of said shaft forming a cam having an exterior surface;

a sleeve having an interior surface concentrically adjacent said exterior surface of said cam and an aperture for positioning a string between said exterior surface of said cam and said interior surface of said sleeve; and

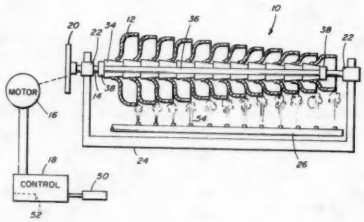
means for rotating said sleeve and cam relative to each other to grasp said string between said exterior surface of said cam and said interior surface of said sleeve.

4,589,322

GLASS HARMONICA

Gerhard Finkenbeiner, 33 Rumford Ave., Waltham, Mass. 02154

Filed Aug. 12, 1983, Ser. No. 522,485
Int. Cl.[4] G10D *13/08*
U.S. Cl. 84—402 **14 Claims**



1. A musical instrument comprising:

(a) a frame:

(b) a rotatable spindle mounted to said frame;

(c) a plurality of quartz cups of different sizes coaxially mounted to said spindle, said quartz cups slidable along the axis of said spindle, said quartz cups configured to produce musical tones;

(d) mounting means for mounting said quartz cups on said spindle, said quartz cups being fixed against slidable movement along the axis of said spindle and fixed against rotation movement relative to said spindle by said mounting means; and

(e) drive means operatively connected to said spindle, said quartz cups constrained to rotate with said spindle, said musical tones being produced by rubbing said rotating quartz cup.

4,589,323

DRUM MUFFLER

Remo Belli, Sherman Oaks, and Donald R. Hartry, La Canada, both of Calif., assignors to Remo, Inc., North Hollywood, Calif.

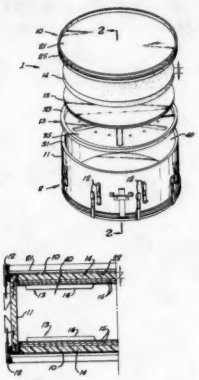
Filed Apr. 29, 1983, Ser. No. 489,836
Int. Cl.[4] G10D *13/02*
U.S. Cl. 84—411 R **19 Claims**

1. A sound altering means for a drum comprising a shell, head fastening means and a head with a playing surface and a rim, the sound altering means comprising:

a circular base with at least one aperture; and

a rim mounting means integral with the circular base, the rim

mounting means being adapted to fit over the edge of the shell so that the circular base is suspended underneath the



playing surface, the rim mounting means being adapted to be held between the edge of the shell and the rim.

4,589,324

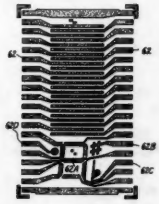
DYNAMIC DISPLAY FOR AUTOMATIC SOUND SIGNAL ANALYZER

Jesse Aronstein, Poughkeepsie, N.Y., assignor to Wright-Malta Corporation, Ballston Spa, N.Y.

Continuation-in-part of Ser. No. 356,501, Mar. 9, 1982, Pat. No. 4,457,203. This application Apr. 26, 1984, Ser. No. 604,305

Int. Cl.⁴ G10G *7/02;* **G09B** *15/02;* **G09G** *3/18;* **G02F** *1/13*

U.S. Cl. 84—454 **12 Claims**



1. A dynamic display for a sound signal analyzer comprising a housing having a plurality of separate electrically excited character forming electrode members electrically insulated from each other; said character forming electrode members being in the form of a quasi-universal character capable upon selective electrical excitation of displaying one of the alphabetic characters A, B, C, D, E, F and G, an electrode member forming a musical sharp note indicator ♯, an electrode member forming a musical flat note indicator ♭ in juxtaposition to said quasi-universal character electrode members for display in conjunction with said alphabetic characters under certain conditions and a plurality of spaced-apart strobe bar electrode members adjacent to the quasi-universal character forming and the sharp and flat electrode members.

4,589,325

CARTRIDGE CONVEYOR, ESPECIALLY FOR CONVEYING CARTRIDGES FROM A DRUM-TYPE MAGAZINE TO A FIRING WEAPON

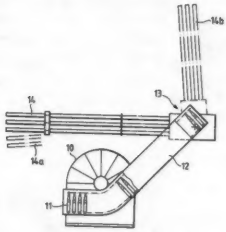
Kurt Müller, Glattbrugg; Paul Kalt, Zurich; Pirmin Steiner, Oberengstringen, and Ernst Hürlemann, Zurich, all of Switzerland, assignors to Werkzeugmaschinenfabrik Oerlikon-Bührle AG, Zurich, Switzerland

Filed Dec. 12, 1983, Ser. No. 560,373

Claims priority, application Switzerland, Dec. 22, 1982, 7474/82

Int. Cl.⁴ F41D *9/02*

U.S. Cl. 89—33.02 **14 Claims**



1. A feed apparatus for feeding cartridges to a firing weapon from a drum magazine subdivided into a predetermined number of sectors extending axially of said drum magazine and in each of which one respective axial row of cartridges is accommodated, comprising:

a first conveyor for successively discharging one axial row of said cartridges after the other from related ones of said axially extending sectors of said drum magazine;

a second conveyor for actively conveying said cartridges which have been discharged from said sectors of said drum magazine to said firing weapon; and

a return movement blocking device arranged between said first conveyor and said second conveyor for preventing cartridges which have been discharged from dropping back into previously emptied ones of said axially extending sectors of said drum magazine.

4,589,326

SELF-LOADING PISTOL IN THE FORM OF A MECHANICALLY LOCKED RECOIL LOADER

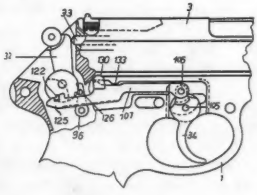
Alexander Kückens, Gross Sarau, and Willi Korth, Ratzeburg, both of Fed. Rep. of Germany, assignors to Technica Entwicklungsgesellschaft mbH & Co. KG, Ratzeburg, Fed. Rep. of Germany

PCT No. PCT/DE82/00052, § 371 Date Oct. 28, 1982, § 102(e) Date Oct. 28, 1982

PCT Filed Mar. 11, 1982, Ser. No. 440,228

Int. Cl.⁴ F41C *5/00*

U.S. Cl. 89—145 **3 Claims**



1. A self-loading pistol including a breech member (3), means for slidably mounting said breech member; a striking pin (33) and means for slidably mounting said striking pin within

said breech member; a striking lever (32) and means for pivotally mounting said striking lever for rotation between a cocked position and a position for engaging said striking pin; a striking rod (40) engaged with said striking lever, and a striking spring (41) engaged with said striking rod for impelling said striking lever from said cocked position into engagement with said striking pin; means on said striking lever for facilitating manual movement of said striking lever from a position adjacent to said striking pin to said cocked position; a trigger (34), a trigger arm (107) connected between said trigger and said striking lever, and means for moving said striking lever to said cocked position upon movement of said trigger toward said striking lever; said striking lever being disposed in alignment with said breech member for moving said striking lever into said cocked position during sliding movement of said breech member toward said striking lever; and means for releasing said striking lever always from the same cocked position for applying equal force to the striking lever by said striking spring during each release of said striking lever.

4,589,327

FIRING LOCK WITH SAFETY SYSTEM FOR SELF LOADING FIRE ARMS

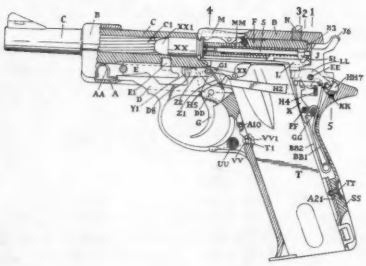
David E. Smith, 5 Park Ave., Telscombe Cliffs, Sussex, England

Filed Mar. 26, 1984, Ser. No. 593,389

Claims priority, application United Kingdom, Mar. 28, 1983, 8308438

Int. Cl.[4] F41C *3/00, 17/04, 19/00;* **F41D** *11/02*

U.S. Cl. 89—148 **10 Claims**



1. A fire arm of the self loading pistol type having a reciprocating slide carrying an inertia-operated firing pin, a firing lock comprising a hammer, sear, trigger, trigger bar, ejector and main spring, and a safety catch comprising an arbor rotatably mounted in the frame of the fire arm, and manual lever means located on the outside of the frame for rotating said arbor in either direction from a rest or off position in which the fire arm can be operated, said arbor being rotatable in one direction to an end position in which the hammer in either the cocked or uncocked position is locked against rotation by respective engagement means on the arbor, and said arbor also being rotatable in the other direction to move a detent member pivotally mounted in said frame to move the ejector upwardly and forwardly to engage said firing pin and to withdraw its striking end, against which the hammer strikes in operation of the fire arm, completely into the slide, and thereafter to release the hammer from cocking engagement with said sear, whereby said hammer is returned to the uncocked position without danger of discharging a live cartridge in the breech of the fire arm.

4,589,328

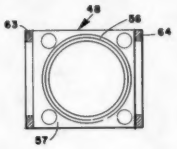
ROTARY PISTON ENGINE WITH RECIPROCATING CYLINDERS HAVING SEALING AND FRICTION REDUCING MEMBERS

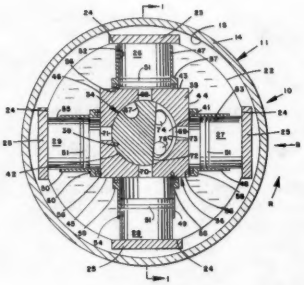
Everett F. Irwin, Dunedin, Fla., assignor to Dynacycle Corporation, Dunedin, Fla.

Filed Jan. 31, 1985, Ser. No. 697,061

Int. Cl.[4] F01B *13/06*

U.S. Cl. 91—498 **2 Claims**





1. A rotary engine comprising, in combination,

a non-rotatable housing having a central axis,

a first member rotatably mounted in said housing for rotation about said central axis and having its axis of rotation coaxial with the axis of said housing,

a first and a second pair of pistons with the pistons of each pair of pistons being diametrically opposed to and coaxial with each other,

said pairs of pistons being rigidly secured to said first member adjacent the external periphery thereof and projecting radially inwardly therefrom,

a power shaft rotatably mounted in said housing and having a shaft portion thereof extending from said housing and a square cam portion thereof disposed within said housing centrally of and spaced from said pistons,

said shaft being eccentrically mounted with respect to said housing and said first member,

said square cam having four flat surfaces thereon with each of said surfaces having one of said pistons disposed perpendicularly relative thereto and, as a result of said eccentric mounting of said shaft, said shaft rotating eccentrically relative to said pistons and said first member,

a cylinder sealingly and telescopically received on each of said pistons with the radially inner end of each cylinder sealingly and slideably engaging a different one of said flat surfaces of said square cam and being disposed constantly perpendicular to such engaged flat surface,

said cylinders being disposed in two pairs with the cylinders of each pair being opposed and coaxial,

two pairs of bridle rings, with each pair of bridle rings connecting one opposed pair of cylinders and said bridle rings insuring that opposed cylinders move conjointly and that their inner ends sealingly engage said square cam,

fluid passageways being formed in said square cam to exhaust and charge said cylinders,

a stationary shaft mounted in said housing coaxially with said power shaft, said stationary shaft rotatably mounting the inner end of said power shaft,

inlet and outlet fluid passageways being formed in said stationary shaft and being positioned confluently with the fluid passageways formed in said square cam,

said cylinders and the piston received therein remaining constantly coaxial to each other and perpendicular to the cam flat they are associated with,

each of said cylinders having a sealing means disposed between the inner end of said cylinder and said cam flat and said inner end of said cylinder includes friction reducing means disposed outwardly of said sealing member to reduce friction between said cylinder and said cam surface and to prevent excess load on said sealing member,

wherein relative rotation between said stationary shaft and said power shaft opens and closes said passageways, and

whereby the fluid from said passageways reacts between said cam flats and the inner ends of said pistons.

4,589,329

PISTON MACHINE HAVING AT LEAST TWO PISTONS

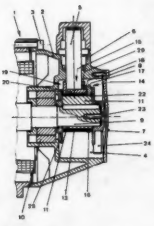
Guido Oberdorfer, Guido-Oberdorfer-Str. 2-8, Bellenberg, Fed. Rep. of Germany (7919)

Filed Jun. 14, 1983, Ser. No. 504,249

Claims priority, application Switzerland, Jun. 18, 1982, 3756/82; Jul. 15, 1982, 4294/82

Int. Cl.⁴ F01B *1/06*

U.S. Cl. 92—72 **5 Claims**



1. A piston machine having at least two pistons and comprising: shaft means for driving the machine; an eccentric mounted on said shaft means; a plurality of pistons within respective cylinders radially disposed about said eccentric and thus having one end closer to the shaft means, each piston having a foot end closer to the shaft means; sleeve means circumferentially disposed around the eccentric for thrusting each piston away from said shaft means; return means circumferentially disposed around the eccentric for pulling each piston toward the shaft means and wherein said sleeve means and said return means are separable; a casing having a cavity therein; a cover means for covering the cavity; bearing means for supporting the shaft means in the casing, the bearing means being disposed in a portion of the casing opposite said cover means and wherein said return means is between the pistons and the cover means; spacer disk means for supporting the eccentric, the sleeve means, and the foot ends, said spacer disk means being disposed between the bearing means and the pistons.

4,589,330

CEILING STRUCTURE

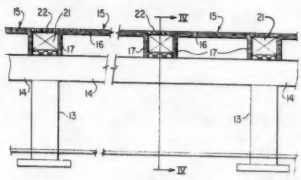
William Teron, Rockcliffe, Canada, assignor to Teron International Urban Corp. Ltd., Ottawa, Canada

Filed Apr. 16, 1982, Ser. No. 369,142

Claims priority, application United Kingdom, Apr. 22, 1981, 8112436

Int. Cl.⁴ F24F *7/00*; E04B *5/48*

U.S. Cl. 98—31 **15 Claims**



1. A ceiling structure for a building comprising a plurality of elongated inverted U-shaped beams, each formed of a top panel and a pair of legs joined along a smooth radius and defining a wide and elongated arch, said arch being shaped and finished to be pleasing to the eye, the beams being spaced laterally parallel to each other a distance apart substantially less than the transverse dimension of said arch, air ducting and lighting structures being contained within the space between said beams, upper and lower walls for said space defining an enclosure between the legs of adjacent beams for containing the air ducting and/or lighting structures whereby air and/or lighting services are provided for said building between said beams yet the major ceiling height and ceiling surfaces for the building are defined by said arches, the building being divided into at least one room, and within said room all said arches are devoid of physical interruption whereby the ceiling of said room is substantially defined by one or more of said elongated arches with clear surfaces raised substantially from the lower extremity of said legs.

4,589,331

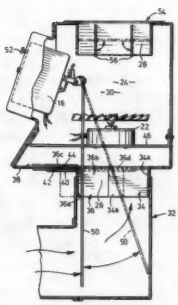
HIGH BLOWER UNIT FOR AIR DISTRIBUTION SYSTEM

Andrew C. Villamagna, 12 Colton Crescent North, Woodbridge, Ontario, Canada (L4L 3L6), and Michelle Simone, 159 Firglen Ridge, Woodbridge, Ontario, Canada (L4L 1N3)

Filed Jul. 2, 1984, Ser. No. 626,885

Int. Cl.⁴ F24F *7/06*

U.S. Cl. 98—39.1 **10 Claims**



1. An air blower assembly for use in an air distribution system in which air is periodically distributed at an elevated rate of flow to a plurality of outlets, comprising;

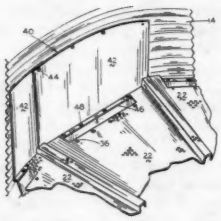
(a) a housing having a through passage for air, said passage having an inlet end and outlet end,
(b) a blower in said housing which is operable to draw air into said inlet end of said through passage and to blow air out of said outlet end of said through passage,
(c) a flow sensing means arranged to detect the presence or absence of a predetermined air flow into said housing,
(d) blower activator means communicating with said blower and said flow sensing means and operable to activate said blower when said predetermined air flow is detected by said flow sensing means and to deactivate said blower when less than the predetermined air flow is detected.

4,589,332

FLASHING SYSTEM FOR A GRAIN DRYING BIN

Donald B. Brockhaus; Calvin L. Fuehrer, both of Fremont; Walter E. Swartz, Wahoo, all of Nebr., and Vernon H. Sietmann, Laurel, Iowa, assignors to Stormor, Inc., Fremont, Nebr.

Filed Sep. 3, 1985, Ser. No. 771,596
Int. Cl.[4] E04H 7/22
U.S. Cl. 98—55 **2 Claims**



1. A grain drying bin comprising,
a base floor,
a cylindrical wall extending upwardly from said base floor,
a roof mounted on the upper end of said wall,
a conically-shaped drying floor positioned within the bin and having its lower periphery secured to said wall and extending upwardly in an inclined direction therefrom,
said conically-shaped floor including a plurality of spaced-apart support members having upper and lower ends, and a perforated floor mounted on said support members,
the lower ends of said support members being operatively secured to said cylindrical wall,
said perforated floor having a plurality of spaced-apart openings formed therein at their lower ends inwardly of said cylindrical wall,
a movable dump hopper means positioned in each of said openings,
and a flashing means secured to the lower end of said drying floor and extending upwardly and outwardly therefrom,
the upper end of said flashing means being secured to said cylindrical wall,
the inclination of said flashing means serving to direct grain to said openings and to reduce the possible accumulation of grain on the lower end of said drying floor.

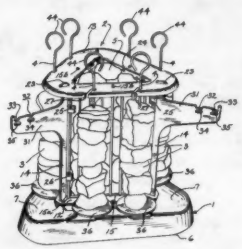
4,589,333

BARBEQUE GRILL

Willard J. Murphy, Hwy. 25, Box 642, Monticello, Minn. 55362

Filed Apr. 26, 1985, Ser. No. 727,442
Int. Cl.[4] A47J 37/04
U.S. Cl. 99—419 **14 Claims**

1. A barbeque grill comprising a base, a polygonal-shaped basket mounted on the base and having a plurality of corners, said basket including a bottom member, a top member, and a plurality of legs interconnecting the bottom member and the top member, said basket also including a plurality of perforated metal sides, a heat source disposed within the basket to cook a food product, a skewer to hold the food product, first mounting means for mounting the skewer in a generally vertical



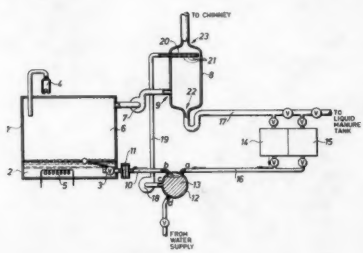
relation on the outside of the basket and second mounting means for mounting the skewer in a generally horizontal relation on the outside of said basket.

4,589,334

APPARATUS FOR TREATING CELLULOSE-CONTAINING MATTER, E.G. STRAW, WITH GASEOUS AMMONIA

Arne L. Andersen, Naestved, Denmark, assignor to Flemstofte-Mads Amby Maskinfabriker A/S, Fuglebjerg, Denmark

Filed Jul. 11, 1983, Ser. No. 512,691
Claims priority, application United Kingdom, Jul. 16, 1982, 8220743
Int. Cl.[4] A23K 1/00
U.S. Cl. 99—534 **6 Claims**

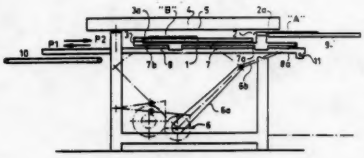


1. Apparatus for treating cellulose-containing matter, such as straw, by passing gaseous ammonia through it, said apparatus comprising:
a processing chamber for receiving material to be processed by passing gaseous ammonia therethrough;
a compartment for containing a substance capable of giving off gaseous ammonia when heated;
heating means for heating a substance capable of giving off gaseous ammonia;
gas/liquid contact means for intimately contacting the gaseous media transported from the processing chamber with an ammonia absorbing substance prior to exhausting said gaseous media; and
blower means communicating with said processing chamber for transporting gaseous media therein to said gas/liquid contact means and exhausting same.

4,589,335
STENCIL PRINTING MACHINE

Ake Svantesson, Apertado 36, Fuengirola, Malaga, Spain

Division of Ser. No. 458,170, Jan. 14, 1983, abandoned. This application Nov. 14, 1983, Ser. No. 551,412
Claims priority, application Sweden, Jan. 19, 1982, 8200276
Int. Cl.⁴ B41F *15/08, 15/10*
U.S. Cl. 101—114 **6 Claims**



1. A stencil printing machine wherein material to be printed follows a path from an insertion position to plural printing positions including: an insertion table; at least two printing tables; one of the printing tables disposed along said path to receive an item of material from said insertion table; said one of the printing tables disposed at a lower height than said insertion table; each successive remaining printing table being at a lower height than a preceding table; at least three reciprocably movable material gripping and displacement arrangements connected to each other; at least two stencil frames for tensioning a stencil above a printing table; a beam member; at least two of the said material gripping and displacement arrangements connected to said beam member to form an assembly of arrangements; means to impart a common reciprocating motion to the arrangements such that in operation in a first position of the assembly a first one of the arrangements grips a first item of material to be printed at said insertion position and the remaining arrangements each grip and hold a respective additional item of material at different respective printing positions; and in a second position of the assembly the first said arrangement holds said first item of material at a first printing position on said one of the printing tables and at least one of said at least three arrangements has simultaneously moved a respective said item of material from said first to a second printing position, a remaining one of said at least three arrangements simultaneously delivering an item of material provided with at least two prints to a delivery position at a lower height than a preceding printing table; said means to impart a common reciprocating motion including a drive mechanism drivingly connected to a drive arm means for providing said reciprocating motion; said at least two material gripping and displacement arrangements being integral with said beam member; said beam member being drivingly connected to said drive arm means, a guide member; said arrangements and said beam member being reciprocatingly displaceable along said guide member, said guide member provided with a free end and a fixed end so as to permit pivotal movement upwards and downwards of the free end about the fixed end so that each item of material is moved sequentially downward from the insertion table to each printing table and then to the delivery position.

4,589,336
SCREEN PRINTING METHOD AND APPARATUS

Gerhard Klemm, Im Rehwinkel 37, D 4800 Bielefeld 1, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 202,052, Oct. 30, 1980, abandoned. This application Aug. 2, 1983, Ser. No. 520,442
Claims priority, application Fed. Rep. of Germany, Oct. 31, 1979, 2943893
Int. Cl.⁴ B41L *13/18*
U.S. Cl. 101—124 **14 Claims**

1. In a screen printing machine, a combination comprising

(1) a substantially flat printing screen having a first side arranged to be contacted by a pool of a printing medium and a second side;

(2) a counter-pressure roller located at the second side of said printing screen and defining with the second side of said printing screen a printing line;

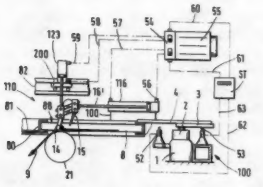
(3) means for reciprocating said printing screen in predetermined directions relative to said counter-pressure roller between spaced-apart first and second positions;

(4) a squeegee unit disposed at said first side of said printing screen and including

(4a) a printing squeegee and a drag squeegee,

(4b) means for positioning said printing squeegee to force the printing medium of said pool through said printing screen in the region of said printing line and against a running workpiece web, which overlies said counter-pressure roller, while said screen moves from said first to said second position,

(4c) means for selectively displacing said squeegees toward and away from said first side of the printing screen so that said printing squeegee is disengaged from



the printing screen upon completion of movement of said printing screen from said first to said second position, so that said drag squeegee is moved into contact with the screen during the initial stage of movement of said screen to said first position and so that said printing squeegee reengages the screen not later than at the time said screen starts to move from said first position back toward said second position with said flood squeegee disengaged from said screen;

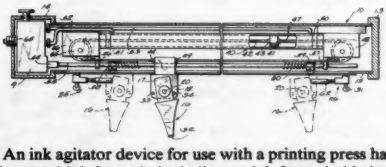
(4d) means for shifting said squeegee unit in said predetermined directions independently of said printing screen, said shifting means moving said squeegees as a unit counter to the direction of movement of said screen as the screen returns to the first position so that said drag squeegee shifts the pool relative to said print line followed by shifting said squeegees in the direction of movement of said screen toward said second position for positioning the printing squeegee for another printing on said workpiece web; and

(5) guide means for said squeegee unit.

4,589,337
INK AGITATOR FOR PRINTING PRESSES

Philip J. Hardin, 850 Park La., Elm Grove, Wis. 53122

Filed Aug. 28, 1985, Ser. No. 770,176
Int. Cl.⁴ B41F *31/06*
U.S. Cl. 101—363 **16 Claims**



1. An ink agitator device for use with a printing press having an elongated ink fountain including an ink fountain blade with a substantially flat upper surface and said fountain having a

longitudinally extending ink fountain roller therein, said agitator device comprising:

elongated support means for being mounted adjacent said ink fountain roller,

a fluid actuator including a longitudinally extending cylinder mounted to said support means and a piston in said cylinder,

a carriage mounted to said support means for translating longitudinally in opposite directions along a path parallel to said cylinder,

a cable loop attached inside of the cylinder to said piston and outside of the cylinder to said carriage and guide means outside of said cylinder arranged to guide said cable such that when said piston translates in said cylinder under the influence of pressurized fluid said carriage translates generally parallel to said cylinder,

an agitator element mounted to said carriage and extending into said ink fountain for translating through ink in said fountain to urge said ink toward said ink roller,

control valve means including a body having an inlet for pressurized fluid and having ports in communication with said cylinder, respectively, at opposite sides of said piston, said valve having an operator which when in a first position causes pressurized fluid to be applied to one side of said piston and relief of pressure from the other side and when in a second position causes pressurized fluid to be applied to said other side and relief of pressure from said one side so as to drive said piston, said carriage and said agitator element cyclically in alternate longitudinal directions, and

longitudinally spaced apart stop elements between which said carriage translates, said stop elements being operatively coupled to said valve operator and responding to approach of said carriage while traveling in one direction by operating said operator to cause said carriage to travel in the opposite direction.

4,589,338

FLEXOGRAPHIC PLATE MOUNTING APPARATUS AND METHOD

Billy Collins, R.R. #1, Vineland, Ontario, and James F. Collins, R.R. #2, Caistor Centre, Ontario, both of Canada

Filed Sep. 25, 1984, Ser. No. 654,085

Claims priority, application Canada, Feb. 17, 1984, 447669

Int. Cl.[4] B41F *5/00, 5/20, 1/28, 27/12*

U.S. Cl. 101—216 **4 Claims**

1. Apparatus for mounting a flexographic plate in registration on a plate cylinder, the flexographic plate having a printing surface and a back surface and being provided with registration holes at one end thereof, said apparatus comprising:

a register cylinder having a row of retractable registration pins, positioned in apertures in the surface thereof;

a plate cylinder positioned adjacent said register cylinder;

means including said registration pins for mounting and registering one end of a flexographic plate on said register cylinder with the printing surface of the flexographic plate positioned for contact with the surface of said register cylinder and with said registration pins extending into the registration holes of the flexographic plate;

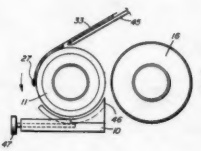
means providing controlled, precise rotation of said register cylinder independently of said plate cylinder to locate the flexographic plate on the surface of said register cylinder with the printing surface of the flexographic plate in contact with the register cylinder surface, and to position the flexographic plate for transfer to said adjacent plate cylinder;

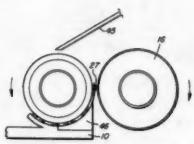
a moveable plate cylinder support for receiving said plate cylinder at a predetermined rotational position;

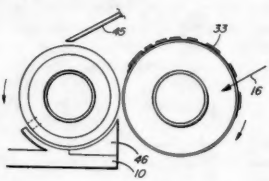
means for moving the plate cylinder to abut a flexographic plate mounted on said register cylinder after the register cylinder has been independently rotated to position the flexographic plate for transfer;

means permitting the registration pins to retract into the register cylinder under pressure from said plate cylinder to release the flexographic plate from said register cylinder; and

means to transfer the flexographic plate from said register cylinder to said plate cylinder including means for further







rotating said register cylinder and said plate cylinder in unison, whereby the flexographic plate is transferred to the plate cylinder in registration, with the back surface of the flexographic plate in contact with the surface of said plate cylinder.

4,589,339

RUBBER BLANKET FOR AN OFFSET ROTARY PRINTING MACHINE

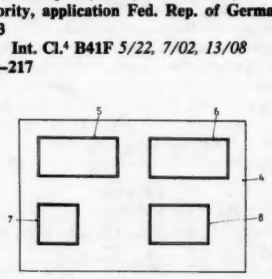
Hermann Fischer, Augsburg, Fed. Rep. of Germany, assignor to M.A.N. Roland Druckmaschinen Aktiengesellschaft, Offenbach am Main, Fed. Rep. of Germany

Filed Sep. 12, 1984, Ser. No. 649,899

Claims priority, application Fed. Rep. of Germany, Oct. 5, 1983, 3336193

Int. Cl.[4] B41F *5/22, 7/02, 13/08*

U.S. Cl. 101—217 **15 Claims**



1. For combination with an offset printing machine cylinder of a rotary offset printing machine,

a blanket structure comprising

a rubber-like cover layer (**14,16**) of a flexible ink-receiving and transferring material; and

a textile base (13,15) located beneath the cover layer,
the cover layer and the textile base being bonded together,
for printing on a printing carrier of subject matter which leaves selected zones of the printing carrier free from printed subject matter,
comprising, in accordance with the invention,
means for decreasing stresses arising in the cover layer upon operation of the printing machine including
interruptions (2,3; 5–8; 10, 11, 12) formed in the cover layer (14,16) and positioned in non-printing zones corresponding to the zones of the carrier free from printed subject matter.

4,589,340

SENSOR CARRIER

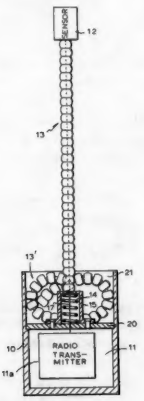
Rolf Hellwig, Neuss; Jens Seidensticker, Kaarst, and Klaus D. Karius, Duesseldorf, all of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Duesseldorf, Fed. Rep. of Germany

Filed Jan. 24, 1984, Ser. No. 573,343

Claims priority, application Fed. Rep. of Germany, Feb. 7, 1983, 3304070

Int. Cl.[4] F42B *23/24;* **F42C** *19/00*

U.S. Cl. 102—293 **6 Claims**



1. A sensor-carrier for a useful load projectile which is adapted to transport and set down a sensor in a predetermined target region, comprising
a first housing having at least two separate chambers;
sensor mounting means operatively mounted in said first housing; and
a sensor operatively connected to said sensor mounting means, said sensor mounting means are flexible and compactly foldable into a relatively small space inside said first housing when in an inoperative retracted position, and said flexible sensor mounting means automatically unfold and extend outside said first housing when said sensor mounting means are in an operative extended position,
whereby after said first housing is opened said sensor mounting means automatically extending said sensor outside said first housing by moving from said inoperative retracted position into said operative extended position,
said sensor mounting means include a plurality of rotationally symmetrically shaped support bodies, each support body has a central axial through-bore, a steel cable extending through the through-bores of the support bodies so as to form a string of support bodies similar to a string of pearls of a pearl necklace, each support body has a pair of opposite flat end faces, adjoining end faces of adjoining support bodies being in abutting contact with each other when said flexible sensor mounting means are in the operative, unfolded, extended and erect position.

4,589,341

METHOD FOR EXPLOSIVE BLAST CONTROL USING EXPANDED FOAM

Charles J. Clark, Grand Prairie, and Edward M. Bennett, Dallas, both of Tex., assignors to Rockwood Systems Corporation, Lancaster, Tex.

Continuation of Ser. No. 579,145, Feb. 10, 1984, abandoned. This application Jun. 13, 1985, Ser. No. 744,511

Int. Cl.[4] F42D *5/00*

U.S. Cl. 102—303 **19 Claims**

1. A method of suppressing the blast effects of an explosive device upon detonation of the same comprising the steps of:
forming a barrier which effectively encloses the explosive device;
said barrier being spaced a predetermined distance from said explosive device and being of a predetermined height;
said step of forming said barrier including positioning at least one tubular barrier element in spaced relation to said explosive device and filling said tubular barrier element with high expansion foam to fill said barrier element with said foam,
said high expansion foam being characterized by the property of flow in all directions and lacking sufficient strength to form a self-supporting three dimensional shape, and
generating a high expansion foam and directing said foam into the space between said explosive device and said barrier to provide a foam barrier which surrounds said explosive device and which is maintained in place by said barrier whereby upon detonation of said explosive device, the compression wave is suppressed by absorption thereof by the foam in its path.

4,589,342

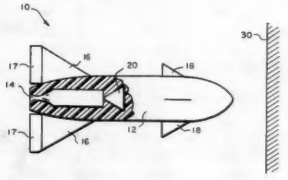
ROCKET-POWERED TRAINING MISSILE WITH IMPACT MOTOR SPLITTING DEVICE

David G. Rousseau, Germantown, Md., assignor to The United States of America as represented by the Secretary of the Navy, Bethesda, Md.

Filed Feb. 28, 1985, Ser. No. 706,825

Int. Cl.[4] F42B *13/205, 15/32*

U.S. Cl. 102—377 **14 Claims**

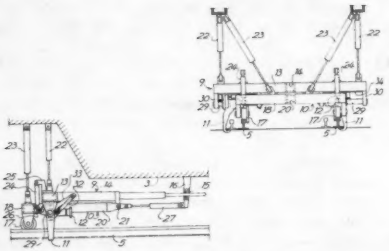


1. A training missile comprising:
a body adapted for aerodynamic free flight fabricated from a predetermined crushable, lightweight material;
a rocket motor disposed in a rear portion of said body; and
a pointed splitter disposed in a middle portion of said body with the point toward said rocket motor;
whereby upon impact of said training missile, said pointed splitter acts to split said rocket motor and to deflect fragments of said rocket motor transversely.

4,589,343
RAIL MAINTENANCE MACHINE THE CHASSIS OF WHICH IS EQUIPPED WITH A DEVICE FOR LIFTING AND SHIFTING A RAILWAY TRACK

Hans Hurni, Crissier, Switzerland, assignor to Matisa Materiel Industriel S.A., Crissier, Switzerland

Filed May 8, 1984, Ser. No. 608,146
Claims priority, application Switzerland, May 19, 1983, 2737/83
Int. Cl.⁴ E01B *33/00, 33/06*
U.S. Cl. 104—7 B **10 Claims**



1. A railway maintenance machine for a railway track having a plurality of lines of rails, said machine comprising a rolling chassis equipped with a device for lifting and shifting the rails of the railway track by means of displacement tools distributed on at least one tool holder connected to the rolling chassis via hydraulic jack displacement controls, in which these tools comprise for each line of rails of the railway track at least one lifting roller and at least one shifting roller in order to lift and shift the track along open sections as well as at least one lifting hook in order to replace the lifting roller along switch gear, in which the shifting roller and the lifting tools are arranged one on the inside and the others on the outside respectively of each line of rails in order to collaborate in the grasping of the track, and in which a device is provided for regulating the upward distance between the lifting hook and the shifting roller, wherein both the lifting hook and lifting roller of each line of rails are mounted movable in height on a common support and said common support is mounted movable on the tool holder which supports these two lifting tools at least in the transverse direction of the track, wherein said common support is in the form of a sleeve mounted movable by translation in the transverse direction of the track as well as movable by rotation in a vertical plane parallel to the longitudinal direction of the track by sliding and rotation along a shaft transverse to the track and fastened to the tool holder supporting the lifting hook and the lifting roller and wherein these two tools are fixed rigidly to said common support in two angularly spaced radial positions, their vertical mobility being obtained by rotation of the common support around the shaft.

4,589,344
MONORAIL CONVEYANCE SYSTEM FOR WIND OR WATER POWERED GENERATOR APPARATUS

Fred E. Davison, Box 37, R.R. #1, Highwood, Mont. 59450

Filed Dec. 27, 1982, Ser. No. 452,957
Int. Cl.⁴ B60K *9/00*
U.S. Cl. 104—24 **10 Claims**

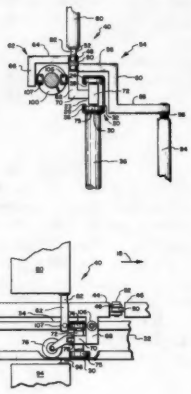
1. A monorail conveyance system for use in generating electrical power from air or water currents, comprising:

(a) a single hollow rail having a substantially rectangular cross-section with opposed pairs of vertical and horizontal sides, one of said sides being formed along a central portion thereof into a continuous longitudinal channel, said channel affording access to the interior of said rail;

(b) a conveyance driven by said currents along said rail; and

(c) a suspension system for supporting said conveyance in its movement along said rail, said suspension system comprising:

(i) a first wheel for bearing the weight of said conveyance, said first wheel being located within the interior of said rail and being oriented to rotate in a vertical plane, and

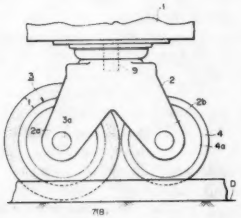


(ii) second and third wheels located within the interior of said rail and oriented to rotate in separate horizontal planes, the diameter of said second and third wheels being slightly less than the separation between the interior surfaces of said opposed vertical sides of said rail, thereby to insure the stability of said conveyance upon said rail.

4,589,345
WHEELED CARRIAGE

Kazuo Fujita, 2971-650, Hishino, Oaza, Seto-shi, Aichi-ken, Japan

Continuation-in-part of Ser. No. 311,020, Oct. 13, 1981, Pat. No. 4,494,464. This application Apr. 16, 1984, Ser. No. 600,812
Claims priority, application Japan, Apr. 19, 1983, 58-69779
The portion of the term of this patent subsequent to Jan. 22, 2002, has been disclaimed.
Int. Cl.⁴ B60B *19/02;* B61F *3/16*
U.S. Cl. 105—170 **3 Claims**



1. A wheeled carriage capable of operating on a twin rail system as well as a flat floor, with at least one wheel unit comprising a first wheel having a core wheel portion which makes contact at two points with said twin rail system and which is provided with a raised peripheral wheel portion which surrounds said core wheel portion, a second wheel which makes contact at two points with said twin rail system, a wheel support for said first and second wheels, and means to pivotally attach said wheel unit to said carriage, said raised peripheral wheel portion being of such a dimension that said

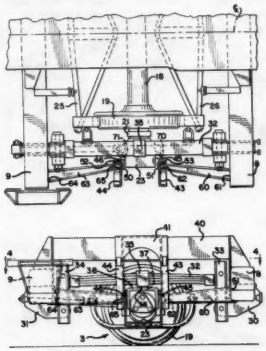
second wheel avoids contacting the flat floor when said carrige is operated on the flat floor.

4,589,346

AXLE STOP ARRANGEMENT FOR SINGLE AXLE WHEEL TRUCK FOR A SKELETON TYPE RAILWAY CAR

Roy W. Miller, Highland, Ind., assignor to Pullman Standard, Inc., Chicago, Ill.

Filed Sep. 26, 1983, Ser. No. 535,406
Int. Cl.[4] B61F *5/42*
U.S. Cl. 105—171 **17 Claims**



1. In a railway car having a longitudinally extending draft and load bearing member and two bolsters rigidly affixed to and extending transversely of said member, said bolsters being longitudinally spaced from each other along said member, a single axle wheel and axle assembly having two wheels and an axle, said wheel and axle assembly having a first axle housing rollingly engaged with a first end portion of said axle and a second axle housing rollingly engaged with a second end portion of said axle and resilient suspension means extending between said bolsters and being supportingly engaged by said housings for cushioned support of said draft and load bearing member, said bolsters and said suspension means rollingly supported by said wheel and axle assembly, said wheel and axle assembly being able to move laterally and longitudinally with respect to said bolsters and said draft and load bearing member due to the resilience of said suspension means, each of the axle housings having two longitudinally facing surfaces, the improvement comprising:

a first rigid bracket support means positioned above said first axle housing and a second rigid bracket support means positioned above said second axle housing, each of said bracket support means extending between and being rigidly affixed to each of said two bolsters;

a first axle stop bracket rigidly affixed to said first bracket support means, said bracket having means depending downwardly from said support means for being positioned in a spaced relationship from the two longitudinally facing surfaces of said first axle housing for limiting longitudinal movement of said axle housing with respect to said bolsters;

a second axle stop bracket rigidly affixed to said second bracket support means, said bracket having means depending downwardly from said support means for being positioned in a spaced relationship from the two longitudinally facing surfaces of said second axle housing for limiting longitudinal movement of said second axle housing with respect to said bolsters; and

each of said means for limiting longitudinal movement of said axle housings being sufficiently laterally outward spaced from a wheel on said axle for preventing engagement between said movement limiting means and a wheel; and

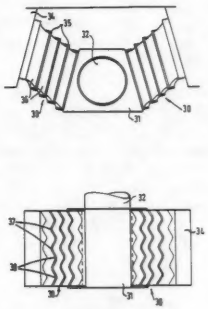
the axle housings being interposed between the means for limiting longitudinal movement and the wheels for preventing interengagement of the movement limiting means and the wheels.

4,589,347

ELASTOMERIC MOUNTINGS

Terence H. Colford, Leicester, and Reginald Harrison, Oadby, both of England, assignors to Dunlop Limited, London, England

Filed Feb. 2, 1983, Ser. No. 463,080
Claims priority, application United Kingdom, Feb. 11, 1982, 8204044
Int. Cl.[4] B61F *5/30*
U.S. Cl. 105—224.1 **10 Claims**



1. A vehicle axle suspension comprising an axle box rotatably mounting one end of an axle and a pair of elastomeric mountings arranged fore and aft of the axle box and a vehicle frame in a V-arrangement such that the longitudinal axes of said mountings are inclined to the vertical and horizontal, each mounting comprising a pair of end faces for subjecting the mounting to a load, a plurality of elastomeric layers having a plurality of substantially inextensible reinforcement layers interleaved between and bonded to said elastomeric layers so as to be able to accommodate relative movement between opposed end faces in three mutually perpendicular directions, said reinforcement layers being of substantially identical size and shape, confronting surfaces of successive reinforcement layers each being of corrugated profile having a plurality of alternate peaks and valleys, said peaks and valley being substantially straight and parallel to one another and extending in a direction transverse to the direction in which said axle extends with the peaks of one surface being aligned with the valleys of the other surface.

4,589,348

RETROFITTED RAILWAY CAR AND METHOD OF PRODUCING SAME

Gus D. Holabeck, Johnstown; William A. Mullen, Berwyn; Charles M. Smith, Strafford, and V. Terrey Hawthorne, Radnor, all of Pa., assignors to Portland General Electric Company, Portland, Oreg.

Filed Oct. 24, 1983, Ser. No. 544,731
Int. Cl.[4] B61F *1/10, 5/16;* B61D *3/00*
U.S. Cl. 105—228 **6 Claims**

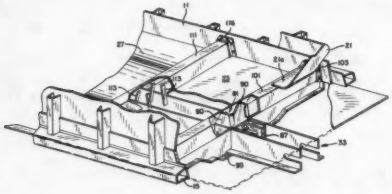
1. In a tub type gondola railroad car having side panels, end panels, and a tub portion flanked longitudinally by shear plates,

a transverse lower bolster unit for each end of the car, with each unit being disposed below but secured to the associated shear plate,

a transverse upper bolster unit for each end of the car disposed in register with the associated lower bolster unit

and disposed above and secured to the associated shear plate, each bolster unit being secured at its ends to said side panels,

each lower bolster unit having a center plate unit,



each shear plate having an opening therein in register with said center plate unit,

said center plate unit projecting upwardly through the associated opening into the associated upper bolster unit and being secured thereto.

4,589,349

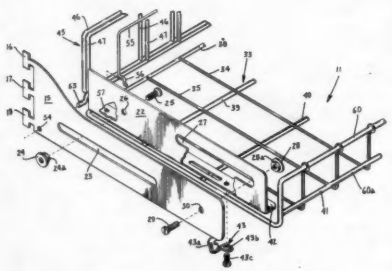
EXTENDIBLE SHELF

James L. Gebhardt, Roswell; James Hanna, Athens, and Douglas Whiten, Marietta, all of Ga., assignors to The Mead Corporation, Dayton, Ohio

Filed May 14, 1982, Ser. No. 378,069

Int. Cl.[4] A47B *11/00*

U.S. Cl. 108—102 **9 Claims**



1. An extendible shelf comprising a pair of elongated primary bracket elements each arranged for mounting at one end thereof on supporting means, a pair of secondary bracket elements telescopically mounted respectively on said primary bracket elements, each of said secondary bracket elements comprising a main panel which is vertically disposed and a horizontal panel integral with one edge of said main panel to form a structure which is L-shaped in cross section, said main panel being arranged to cooperate with the associated primary bracket element to provide a telescoping relationship therebetween, a main shelf element supported by and movable with said secondary bracket elements and arranged with its ends secured respectively to said horizontal panels of said secondary bracket elements, a collapsible shelf element having at least two hingedly connected parts one of which is hingedly connected with the rear of said main shelf element and the other of which is hingedly connected with said primary bracket elements respectively, said collapsible shelf element being in collapsed condition when said main shelf element is in its retracted position and being effective to form a supplementary shelf at the rear of said main shelf element when said main shelf element and said secondary bracket elements are in their extended positions, said main shelf element being disposed in substantially the same plane when in its retracted and extended positions and during movement between these positions, and securing means arranged to hold said primary and said secondary bracket elements against telescopic movement so as to hold said collapsible shelf element in a collapsed or horizontal position.

4,589,350

SHELF ASSEMBLY

Eero Tapojärvi, Perttiläntie 14, 08500 Lohja as, Finland

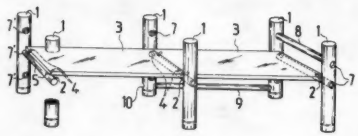
PCT No. PCT/FI82/00027, § 371 Date Mar. 5, 1984, § 102(e) Date Mar. 5, 1984, PCT Pub. No. WO84/00289, PCT Pub. Date Feb. 2, 1984

PCT Filed Jul. 16, 1982, Ser. No. 598,304

Claims priority, application Finland, Jan. 26, 1981, 810211

Int. Cl.[4] A47B *47/00*

U.S. Cl. 108—111 **3 Claims**



1. A shelf assembly, comprising a pair of spaced upright side members, a generally horizontal cross bar connecting said side members, a shelf board disposed between the side members and supported on the cross bar, said cross bar having a first generally radial opening extending at an angle of about 45° to the horizontal and the lower surface of said shelf board having a second opening extending at an angle of about 45° to the horizontal and aligned with said first opening, said second opening extending only partially through said shelf board, and a dowel disposed within said aligned openings.

4,589,351

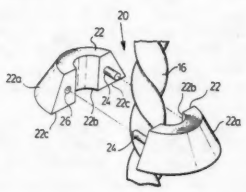
VERTICAL SUPPORT APPARATUS

Norman H. Love, R.R. #1, Maple Beach Rd., Beaverton, Canada (L0K 1A0)

Filed Oct. 23, 1984, Ser. No. 664,022

Int. Cl.[4] A47B *3/00*

U.S. Cl. 108—111 **3 Claims**



1. A support device for use in association with an object and at least one vertical support member, the object defining at least one receptor opening whereby the object may be slidably located on the vertical support member, wherein each said receptor opening is a hole defined by a truncated conical surface, tapering upwardly, in the object, the support device comprising two wedge clamps adapted to at least partially fit within each said receptor opening whereby the object is operable to press said wedge clamps against the vertical support member, wherein each said wedge clamp defines top and bottom planar surfaces in parallel spaced apart planes, an inner surface adapted to contact and be secured against said vertical support member, two planar side surfaces of generally truncated wedge shape in elevation located on opposite sides of said inner surface, normal to said top and bottom surfaces, an outwardly extending abutment on one said side surface along a

first axis, and a mating recess on said other of said side surfaces along a second axis, said first and second axes being parallel and spaced apart from one another, the recess of one said wedge clamp being adaptable to slidably receive the abutment of another said wedge clamp, with the said first and second axes of said respective abutments and recesses being aligned, and in registration with one another, and wherein each said wedge clamp defines an outer surface generally corresponding to and operable to co-operate with said conical surface in said receptor opening.

4,589,352

FLUIDIZED BED COMBUSTION APPARATUS

Max L. G. van Gasselt, Apeldoorn, and Louis M. Rappoldt, Ugchelen, both of Netherlands, assignors to Nederlandse Centrale Organisatie Voor Toegepast-Natuurivetenschap-, The Hague, Netherlands

Continuation-in-part of Ser. No. 580,413, Feb. 15, 1984, Pat. No. 4,532,871. This application Jan. 24, 1985, Ser. No. 694,528

Claims priority, application Netherlands, Feb. 18, 1983, 8300617; European Pat. Off., Apr. 28, 1984, 84201246.0

Int. Cl.[4] F23J *3/00*

U.S. Cl. 110—216 **4 Claims**

1. A fluidized bed combustion apparatus, comprising:

(a) a housing,

(b) support means in the housing adjacent the bottom thereof for supporting a bed of particulate material including particulate combustible material,

(c) particulate infeed means adjacent the support means for supplying particulate material to said support means,

(d) air inlet means in the housing below the support means for supplying combustion air to a bed of particulate material on the support means,

(e) combustion gas outlet means in the top of the housing,

(f) a plurality of upwardly directed channel walls in the housing above the support means defining a channel between adjacent walls,

(g) a pair of opposed arrays of superimposed plates in each channel, the plates of one array of the pair extending obliquely downward and inward from one channel wall, and the plates of the other array of the pair extending obliquely downward and inward from the opposite wall of said channel, and

(h) underneath each plate an inwardly extending protrusion which is arranged in vertical section in substantially triangular shape and which is mounted with its base to said channel wall so that the apex of the triangle is spaced apart from the terminal edge of the associated plate in horizontal direction over a distance "c" for which applies $0<c<\frac{1}{4}A$ and in vertical direction over a distance "d" downwardly, or "e" upwardly from said terminal edge for which applies $0 \leqq d$ or $e \leqq A$, wherein A is the horizontal distance between adjacent channel walls.

4,589,353

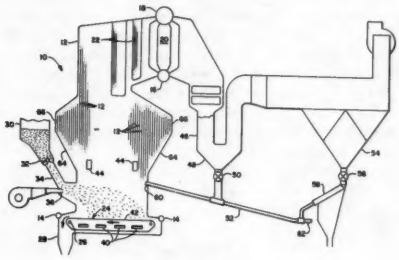
WOOD BURNING FURNACE

Wesley P. Bauver, II, Poquonock, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.

Filed Jan. 29, 1985, Ser. No. 696,176

Int. Cl.[4] F23G *5/00, 7/00*

U.S. Cl. 110—244 **1 Claim**



1. In combination, a furnace having four walls for burning cellulosic fuel therein, a grate in the furnace bottom on which the fuel is burned, means for introducing cellulosic fuel onto the grate, means for introducing air into the furnace for supporting combustion of the fuel, a rear gas pass connected to the upper end of the furnace, the walls of the furnace being inclined upwardly and outwardly from the grate in such a manner that at a given height above the grate, the cross-sectional flow area is $1\frac{1}{2}$ to 2 times the flow area closely adjacent to the grate, such that most of the partially burned char particles entrained in the gases near the grate reach a height in the furnace where the gas velocity equals the particle terminal velocity, so that most of the particles remain suspended at this height until combustion has reduced their size enough so that they can be carried into the rear pass by the reduced gas velocity.

4,589,354

APPARATUS FOR THE RECOVERY OF GASES FROM WASTE MATERIALS

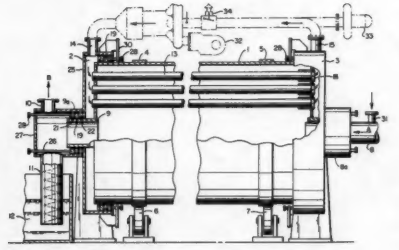
Erich Faehnle, Aalen, Fed. Rep. of Germany, assignor to PKA Pyrolyse Kraftanlagen GmbH, Aalen, Fed. Rep. of Germany

Filed Dec. 19, 1984, Ser. No. 683,375

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1983, 3346338

Int. Cl.[4] A47J *36/24*; F27B *7/24*

U.S. Cl. 110—246 **4 Claims**



1. In an apparatus for subjecting a particulate feed material of household, industrial and the like refuse to pyrolysis comprising a rotatable cylindrical pyrolysis drum having opposite end walls; a stationary cylindrical gas collecting chamber at each end of and coaxial with said drum, each collecting chamber comprising inner and outer walls the inner wall also being

the respective drum end wall; a plurality of heating gas conduits extending through said drum the opposite ends of which are supported in the opposite end walls of said drum, said conduits providing communication between said gas collecting chambers; and means external to said drum providing communication between said gas collecting chambers, the improvement which comprises: a coaxial hollow cylindrical housing integral with the outer wall of each gas collecting chamber, said housing being of smaller diameter than said drum; a coaxial hollow connecting member integral with each end wall of said drum extending into its respective cylindrical housing thereby providing means for introducing feed material into one end of said drum and for removing pyrolysis products from the other end; sealing means between each connecting member and its respective cylindrical housing comprising a seal disc within said cylindrical housing mounted on the outer circumferential surface of said connecting member, said seal disc having at least two seal rings in contact with said connecting member circumferential surface; two contact rings within said cylindrical housing mounted on the inner circumferential surface of said cylindrical housing and in abuting relation with the oppiosite ends of said seal disc, each of said contact rings having at least two seal rings in contact with said inner cylindrical surface; and a threaded rod within said cylindrical housing the rearward end of which is mounted in the rearward wall of said cylindrical housing and the forward end of which cooperates with one of said contact rings whereby pressure can be placed on said seal disc.

4,589,355

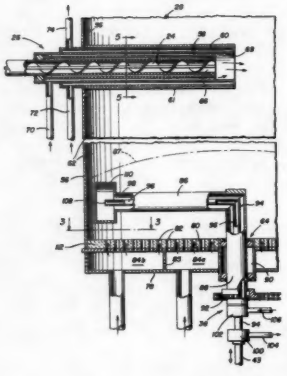
PARTICULATE WASTE PRODUCT COMBUSTION SYSTEM

Charles E. Chastain, and Donald R. King, both of Stuttgart, Ark., assignors to PRM Energy Systems, Inc., Stuttgart, Ark.

Continuation-in-part of Ser. No. 465,648, Feb. 10, 1983, Pat. No. 4,517,905. This application Apr. 2, 1985, Ser. No. 719,712

Int. Cl.[4] F23G *5/00, 7/00*

U.S. Cl. 110—346 **12 Claims**



1. In combination with apparatus for incinerating combustible material within a fluidized bed, including the steps of: feeding the material into a fluidizing zone within which the bed is formed; introducing combustion supporting gas to said fluidizing zone in a plurality of inflow streams of different velocities insufficient to fluidize the material; continuously agitating the material to mechanically fluidize the same within said fluidizing zone during combustion and cause displacement of residual ash from the zone; and withdrawing the residual ash from a discharge location in the apparatus outside of the fluidizing zone.

4,589,356

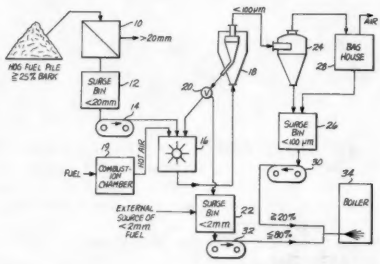
ENERGY RECOVERY FROM BIOMASS USING FUEL HAVING A BIMODAL SIZE DISTRIBUTION

Terry N. Adams, Tacoma; Robert M. Spurrell, Auburn, both of Wash.; Grant G. Karsner, Vorhees Township, Camden County, N.J.; Gregory P. Golike, and James F. L. Lincoln, both of Auburn, Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.

Filed Aug. 22, 1985, Ser. No. 768,269

Int. Cl.[4] F23D *1/00*

U.S. Cl. 110—347 **28 Claims**



1. A process for burning a particulate biomass fuel over a range of load conditions in an air suspension fired burner which comprises:

providing a principal fuel component in which at least 90% by weight of the particles do not exceed about 10 mm in any dimension and the moisture content does not exceed about 25%;

further providing an ignition fuel component in an amount equivalent to at least 10% of the heat value of the combined principal and ignition fuels when the boiler is used at full load conditions, said ignition fuel having a particle size not exceeding about 100 µm diameter and having a moisture content not exceeding about 15%;

delivering said fuel components to a burner while suspended in a stream of primary air; and

varying the amount of the principal fuel component supplied to the burner in response to burner load changes while maintaining the amount of the ignition fuel component essentially constant so that at higher turndown ratios the ratio of ignition fuel to principal fuel is increased, whereby the ignition fuel provides sufficient energy to the principal fuel to maintain stable combustion over a range of turndown conditions of at least 2:5:1 without the need for supplemental fossil fuel.

4,589,357

METHOD FOR REDUCING COMMINUTION ENERGY OF A BIOMASS FUEL

James F. L. Lincoln, Auburn; Manfred K. Buder, Federal Way; Craig A. Brown, Puyallup; Gregory P. Golike, and Robert M. Spurrell, both of Auburn, all of Wash., assignors to Weyerhaeuser Company, Tacoma, Wash.

Filed Aug. 22, 1985, Ser. No. 768,306

Int. Cl.[4] F23D *1/00*

U.S. Cl. 110—347 **16 Claims**

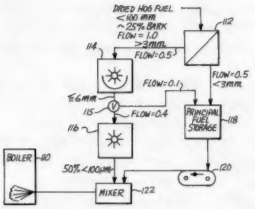
1. A process for reducing comminution energy required for preparation of a biomass fuel source containing a mixture of materials having differing friability into a particulate fuel capable of self-sustaining combustion in an air suspension fired burner which comprises:

providing a principal fuel component from the fuel source in which at least about 90% by weight of the particles do not exceed about 10 mm in any dimension and the moisture content does not exceed about 25%;

selecting a sufficient quantity of the more friable material from the fuel source and drying and comminuting this

material to provide an ignition component having a particle size not exceeding about 100 μm diameter and a moisture content not exceeding about 15% in an amount equivalent to at least 10% of the total heat value of the combined principal and ignition fuel components; and

adjusting the ratio of principal and ignition fuel components



so that when both are fired in an air suspension-type burner the ignition component provides sufficient energy to the principal fuel component to maintain stable combustion, whereby during fuel preparation only a predetermined amount of the most friable material need be finely comminuted thereby reducing the overall energy required for fuel preparation.

4,589,358

AUTOMATIC POCKET OPENING SEWING MACHINE HAVING A CUTTING DEVICE FOR PRODUCING NOTCHING CUTS

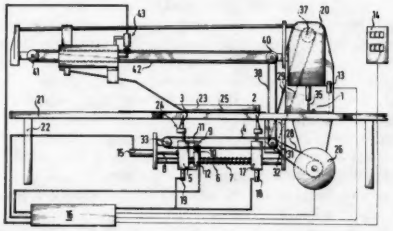
Heinz Goldbeck, Bielefeld; Horst Plassmeier, Herford, and Klaus Möller, Bielefeld, all of Fed. Rep. of Germany, assignors to Durkoppwerke GmbH, Fed. Rep. of Germany

Filed Feb. 7, 1985, Ser. No. 699,027

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1984, 3404758

Int. Cl.⁴ D05B *3/00*

U.S. Cl. 112—68 **14 Claims**



1. An automatic pocket opening sewing machine having a cutting device for producing two notching cuts at ends of the pocket entrance:

the sewing machine comprising a sewing needle and means for operating the needle for sewing sewn parts passing by the sewing needle; means for first clamping to the sewn parts and for then advancing the sewn parts in an advancing direction past the sewing needle;

the cutting device comprising two knives arranged in sequence downstream of the needle in the advancing direction of the sewn parts, and the knives being disposed above a surface of the sewn parts; a respective operating device for each knife for moving the knife to a cutting position for making a respective gusset cut in a sewn part;

the knife nearer to the sewing needle being stationary along the direction of advance of the sewn parts; the knife further from the sewing needle being movable toward the stationary knife for adjusting the spacing between the movable and stationary knives for making cuts which are desirably spaced apart;

means for temporarily engaging the movable knife and for moving the movable knife counter to the direction of advance of the sewn parts and toward the stationary knife for establishing the desired spacing of the cuts to be made by the stationary and movable knives.

4,589,359

WORKPIECE RECEIVING DEVICE FOR A SEWING MACHINE, IN PARTICULAR FOR A COMPUTER-CONTROLLED AUTOMATIC SEWING DEVICE

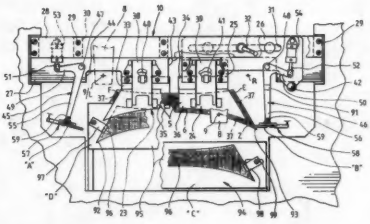
Hans Scholl, Oerlinghausen-Lipperreihe, Fed. Rep. of Germany, assignor to Kochs Adler AG, Fed. Rep. of Germany

Filed Oct. 28, 1985, Ser. No. 791,788

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1984, 3443314

Int. Cl.⁴ D05B *21/00*

U.S. Cl. 112—121.12 **7 Claims**



1. A workpiece receiving device for a sewing machine, in particular for a computer-controlled automatic sewing device, for receiving a workpiece having at least one tip and to be provided with a seam at its marginal area, said workpiece being in particular a shirt collar, and said workpiece receiving device having receiving elements for clampingly receiving said workpiece on one side of the seam to be generated, wherein the workpiece receiving device is provided with at least one auxiliary workpiece clamp tiltable from an inoperative position into an operative position so as to clamp the workpiece tip.

4,589,360

SEWING CONTROL SYSTEM FOR A SEWING MACHINE

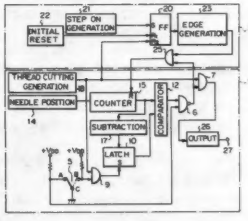
Hideo Yasui, Tokyo, Japan, assignor to Tokyo Juki Industrial Co., Ltd., Chofu, Japan

Filed Aug. 16, 1985, Ser. No. 766,904

Claims priority, application Japan, Aug. 31, 1984, 59-182292

Int. Cl.⁴ D05B *19/00, 69/20*

U.S. Cl. 112—121.11 **5 Claims**



1. A sewing control system for a sewing machine comprising:

a first circuit for generating a signal synchronized with the rotation of the sewing machine main shaft;

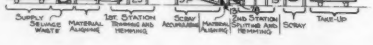
a second circuit for generating a sewing finish signal;
a count circuit for counting the output from said first circuit;
an arithmetic logical circuit for calculating in accordance with the output from said count circuit;
a memory circuit for latching the output value from said arithmetic logical circuit as a reference value in accordance with the output from said second circuit;
a third circuit for prohibiting latching to said memory circuit after said reference value is latched;
a comparator circuit for comparing said reference value with the output value from said count circuit;
a fourth circuit for initializing said count circuit only when there is a comparison output from said comparator circuit while said third circuit is in effect; and
a fifth circuit for outputting a sewing finish signal from said second circuit to the output terminal only when there is a comparison output from said comparator circuit.

4,589,361

APPARATUS AND METHOD FOR AUTOMATICALLY GUIDING, TRIMMING, SPLITTING AND SIDE HEMMING CONTINUOUS TEXTILE MATERIAL

Dennis L. Starnes; William G. Kimball, and David K. Keziah, all of Kannapolis, N.C., assignors to Cannon Mills Company, Kannapolis, N.C.

Filed Sep. 28, 1984, Ser. No. 656,040
Int. Cl.[4] D05B *97/00, 21/00, 35/02*
U.S. Cl. 112—262.3 **37 Claims**



1. Apparatus for automatically guiding, trimming, splitting and side hemming continuous textile material, having thickened individual portions, such as terry towels, woven therein in side-by-side relationship transversely of the material and in series longitudinally of the material and being separated by a thinned portion extending longitudinally along generally the middle of the material and having thinned selvage edge portions extending along each longitudinal side edge of the material; said apparatus comprising:

frame means;

means carried by said frame means for feeding the continuous textile material from a supply through said apparatus in a generally longitudinally-extending path of travel;

a first work station having movable means positioned on each side of the traveling material for trimming each of the selvage edge portions to a predetermined width, folding hems in each of the trimmed selvage edges and stitching each of the folded hems as the material is fed through said first work station, and means mounted on said frame means and carrying said trimming, folding and stitching means for individually moving and aligning said trimming, folding and stitching means on each side of the traveling material in proper transverse position relative to each of the respective selvage edges regardless of transverse deviation of the longitudinal paths of travel of such selvage edges as the material travels through said first work station; and

a second work station positioned subsequent to said first work station in the path of travel of the material and having stationary means carried by said frame means for longitudinally splitting the material through the thinned middle portion into strips, folding hems in the thus formed longitudinally-extending cut side edges of the strips and stitching each of the folded hems, and means carried by said frame means for aligning the thinned middle portion of the traveling material relative to said stationary splitting, folding and stitching means for splitting the material through generally the center of the thinned middle portion and forming uniform stitched hems on each cut edge.

25. Apparatus for automatically guiding, splitting and hemming the cut edges of continuous textile material having thickened individual portions, such as terry towels, woven therein in side-by-side relationship transversely of the material and in series longitudinally of the material and being separated by a thinned portion extending longitudinally along generally the middle of the material said apparatus comprising:

frame means;

means carried by said frame means for feeding the continuous textile material through said apparatus in a generally longitudinally-extending path of travel;

means mounted in a stationary position on said frame means for longitudinally splitting the material through the thinned middle portion into strips;

means mounted in a stationary position on said frame means for folding hems in the thus formed longitudinally-extending cut side edges of the strips;

means mounted in a stationary position on said frame means for stitching each of the folded hems;

a bowed guide rod means positioned in advance of said splitting, folding and stitching means in the path of travel of the material and defining an outside convex surface and being pivotally mounted on said frame means for receiving the traveling material over said convex surface and for being moved about its pivot in generally the longitudinal direction of the traveling material to cause the traveling material to move transversely;

means carried by said frame means and connected to said bowed guide rod means for pivotally moving said bowed guide rod means back and forth; and

sensing and control means mounted onto said frame means and connected with said means for moving said bowed guide rod means for sensing the longitudinal path of travel of the thinned middle portion of the material and controlling movement of said bowed guide rod means for aligning the thinned middle portion of the traveling material relative to said stationary splitting, folding and stitching means for splitting the material through generally the center of the thinned middle portion and forming uniform stitched hems on each cut edge.

30. Method for automatically guiding, trimming, splitting and side hemming continuous textile material having thickened individual portions, such as terry towels, woven therein in side-by-side relationship transversely of the material and in series longitudinally of the material and being separated by a thinned portion extending longitudinally along generally the middle portion of the material and having thinned selvage edge portions extending along each longitudinal side edge of the material; said method comprising the steps of:

feeding the continuous material from a supply through an automatically operating apparatus;

trimming each of the selvage edge portions of the traveling material to a predetermined width, folding hems in each of the trimmed selvage edges and stitching each of the folded hems with mechanisms in a first work station of the apparatus while the material is fed through the first work station in the apparatus;

individually moving and aligning the mechanisms for trimming, folding and stitching on each side of the traveling material in proper transverse positions relative to each of the selvage edges regardless of transverse deviation in the longitudinal paths of travel of such selvage edges as the material travels through the first work station;

longitudinally splitting the material through the thinned middle portion into strips, folding hems in the thus formed longitudinally-extending cut side edges of the strips and stitching each of the folded hems with mechanisms in a second work station in the apparatus; and

aligning the thinned middle portion of the traveling material relative to the splitting, folding and stitching mechanisms for splitting the material generally through the center of

the thinned middle portion and forming uniform stitched hems on each cut edge as the material travels through the second work station.

4,589,362

THREAD CUTTING DEVICE IN LOCKSTITCH SEWING MACHINES

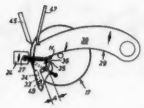
Albert Düsch, Kaiserslautern, Fed. Rep. of Germany, assignor to Pfaff Industriemaschinen GmbH, Fed. Rep. of Germany

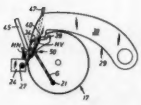
Filed Mar. 9, 1983, Ser. No. 473,607

Claims priority, application Fed. Rep. of Germany, Mar. 6, 1982, 3208159

Int. Cl.⁴ D05B *65/00*

U.S. Cl. 112—292 **17 Claims**





1. A thread cutting device for a sewing machine having a rotary hook and a bobbin case mounted in the rotary hook with a bobbin thread supplyable from the bobbin case and a needle thread movable by a sewing machine needle, comprising:

a thread catcher having a rotatably mounted arm;

drive means connected to said thread catcher arm for rotating said arm over at least a portion of the bobbin case; and

a cutting tool associated with said thread catcher arm for cutting needle and bobbin thread;

said thread catcher arm including a catch shoulder extending toward the bobbin case for catching the bobbin thread, a retaining shoulder for retaining a loop of needle thread after the needle thread is passed around the bobbin case, said retaining shoulder having a dimension which determines the length of a portion of needle thread retained by said retaining shoulder which is substantially the same as a distance between a needle thread catch position and a cutting position for said catch shoulder of said thread catcher arm.

4,589,363

SEWING MACHINE FOR AUTOMATICALLY MAKING EDGE-PARALLEL SEAMS

Erich Willenbacher, Kaiserslautern, and Fritz Jehle, Enkenbach-Alsenborn, both of Fed. Rep. of Germany, assignors to Pfaff Industriemaschinen GmbH, Fed. Rep. of Germany

Filed Sep. 24, 1985, Ser. No. 779,491

Claims priority, application Fed. Rep. of Germany, Oct. 6, 1984, 3436771

Int. Cl.⁴ D05B *27/08, 35/10*

U.S. Cl. 112—308 **10 Claims**

1. A sewing machine comprising:

positioning means for positioning a sewing needle;

a feed dog for feeding a workpiece having a workpiece edge and a corner point, past the needle in a feeding direction;

scanning means for scanning the workpiece and for recognizing the workpiece edge;

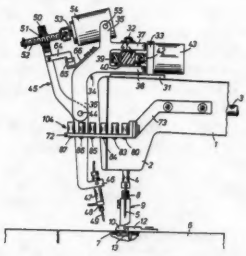
a pressure piston spaced laterally of the needle with respect to the feed direction;

setting means connected to the pressure piston for lowering the pressure piston so that it can be brought into contact with the workpiece;

stopping means connected to said positioning means for stopping the positioning means with the needle inserted in the corner point of the workpiece; and

pivot means connected to said pressure piston for pivoting said pressure piston about an axis of said needle when said setting means lowers said pressure piston.

7. A sewing machine comprising a positioning device for positioning a needle of the sewing machine, at least one feed dog for feeding a workpiece, a guide device for automatically



making an edge-parallel seam with a guide ruler for a workpiece edge, a scanning device for recognizing the workpiece edge, a pressure piston spaced laterally from the needle, setting means for lowering the pressure piston, stopping means connected to the positioning drive for stopping the drive with the needle inserted in a seam corner point of the workpiece, and displacement means connected to the pressure piston for pivoting the pressure piston about an axis of the needle.

4,589,364

SEWING MACHINE TOP FEED

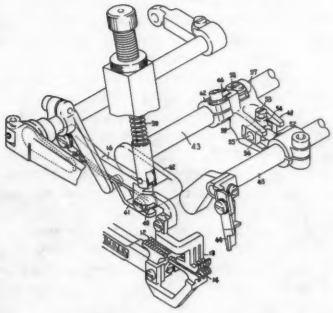
Khoichi Yamamoto, and Takashi Kasuda, both of Osaka, Japan, assignors to Pegasus Sewing Machine Mfg. Co. Ltd., Osaka, Japan

Filed Dec. 2, 1983, Ser. No. 557,764

Claims priority, application Japan, Dec. 9, 1982, 57-216400; Dec. 21, 1982, 57-225294

Int. Cl.⁴ D05B *27/06*

U.S. Cl. 112—311 **17 Claims**



1. A top feed device for coaction with a bottom feed device having a lower feed dog in a sewing machine, said top feed device comprising:

(a) an upper feed arm supported for vertical swinging movement on a drive member adapted to be operatively coupled to the bottom feed device and movable for horizontal reciprocation, said upper feed arm having an upper feed dog mounted on a free end thereof and positioned to confront the lower feed dog;

(b) spring means for depressing the upper feed arm;

(c) a mechanism for vertically moving said upper feed dog,

said mechanism including a crank swingable vertically in response to movement of a drive shaft, the crank having a slider means held in slidable engagement with said upper feed arm for vertically moving said upper feed arm in coaction with said spring means, a swingable shaft having an end, said crank being fixed to said end, a lever angularly movably supported on said swingable shaft and swingable in response to rotation of said drive shaft, and clutch means for disconnectably transmitting swinging movement of said lever to said swingable shaft, said clutch means comprising engagement portions disposed on said swingable shaft and said lever and disengageable from each other in a circumferential direction, said engagement portions on said swingable shaft being normally held against said engagement portions on said lever under the action of said spring means; and

(d) retainer means for supporting said slider means against movement away from said upper feed arm.

4,589,365

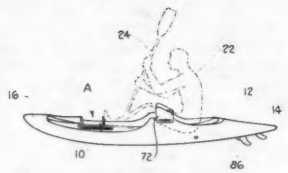
OPEN-COCKPIT KAYAK

William E. Masters, 313 Dogwood La., Easley, S.C. 29640

Filed Oct. 29, 1984, Ser. No. 665,949

Int. Cl.[4] B63B *35/72*

U.S. Cl. 114—347 **18 Claims**



1. An open-cockpit kayak comprising:

an elongated buoyant hull having an upper deck,

an elongated open cockpit formed in said upper deck continuously open about a cockpit perimeter for receiving a person in an open sitting position;

a cockpit deck included in said open cockpit having a generally horizontal surface;

a cockpit floor lying below said cockpit deck;

a contoured cockpit seat having a first contoured surface sloping generally downwards from said cockpit deck terminating in a contoured seat portion below the level of said cockpit deck and a second contoured surface sloping upwardly and rearwardly from said contoured seat portion providing a rear hip brace surface for bracing a hip portion of a person seated in said cockpit seat;

a pair of opposed side thrust and support extensions extending longitudinally along a length of said cockpit on opposing sides thereof and upwardly above the level of said cockpit deck;

thigh brace means carried by said side extension projecting inwardly of said opposing sides, said brace means including concavely contoured thigh engaging surfaces projecting over said cockpit deck at a position spaced above the level of said cockpit deck so that brace means may be engaged by an upper outside portion of the thighs of a person seated in said cockpit seat;

foot brace means carried adjacent ends of said cockpit floor at a position below the level of said cockpit deck for engaging the feet of said person seated in said cockpit seat; and

said contoured hip brace surface, said thigh engaging brace means, and said foot brace means cooperating with one another to interbrace said person seated in said cockpit seat in such a manner that said person is effectively secured within said open cockpit for retention and transmitting thrusts effectively from manual paddle strokes to propel and guide said kayak.

4,589,366

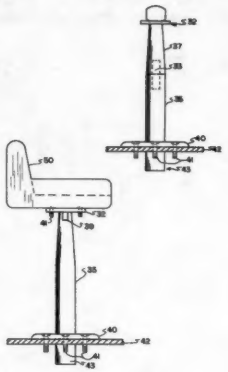
SKI PYLON

Kevin J. Eiber, 3931 Lake Vista Rd., Akron, Ohio 44319

Filed Aug. 17, 1984, Ser. No. 641,758

Int. Cl.[4] B63B *17/00*

U.S. Cl. 114—363 **8 Claims**



1. A water ski tow assembly for installation in a boat, comprising:

a cylindrical resilient pylon of two-piece construction, said pylon being tapered from its mounting end to an apex, said apex being a hemispherical cap;

a mounting base plate, said pylon being adapted to be mounted on said base plate and said base plate being adapted to be mounted on a floor of the boat; and

wherein said two pieces of said pylon are adapted to be separated and a fishing seat apparatus is adapted to be mounted to a base portion of said pylon upon removal of a top portion thereof.

4,589,367

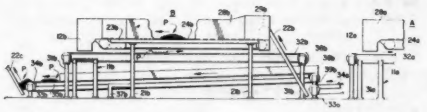
SYSTEM FOR AUTOMATICALLY PAINTING PENCILS

Charles G. Renegar, and Russell D. Agee, both of Shelbyville, Tenn., assignors to Empire Enterprises, Inc., Shelbyville, Tenn.

Filed Oct. 1, 1984, Ser. No. 656,754

Int. Cl.[4] B05C *3/10*

U.S. Cl. 118—66 **15 Claims**



1. A system for automatically applying multiple coats of paint to unfinished pencils from a pencil production line, comprising a plurality of paint stations each including paint means for receiving said pencils and applying paint completely about the respective peripheral surfaces of said pencils, supply conveyor means for discharging said pencils to said paint means, and elongate drying conveyor means for receiving said pencils from said paint means and drying the paint applied by said paint means, said plurality of stations being arranged in sequence for successively applying paint to said pencils, with the supply conveyor means of the first station in sequence having

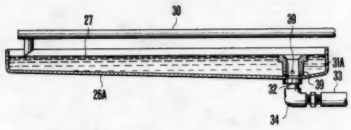
a zone for receiving said pencils from said production line and the supply conveyor means of each subsequent station being respectively cooperable with the drying conveyor means of the corresponding preceding station in sequence so that pencils may be transported automatically from one paint station to the next, and with the drying conveyor means of the last station in sequence having a zone from which said pencils exit the system.

4,589,368

VARNISH COATER FOR PRINTED PRODUCT

Minoru Tomita, Ibaragi, Japan, assignor to Komori Printing Machinery Co., Ltd., Azumabashi, Japan

Filed Sep. 28, 1984, Ser. No. 655,943
Int. Cl.[4] B05C *11/10*
U.S. Cl. 118—258 **6 Claims**



1. A varnish coater for coating a printed product comprising:

a bucket-like varnish pan for storing varnish;

a varnish supply pipe disposed above said varnish pan for supplying said varnish from a varnish tank;

a varnish drain port means provided in a bottom of said varnish pan to be coupled with a varnish drain pipe; and

an overflow means surrounding said varnish drain port means so that when the level of said varnish exceeds a predetermined varnish level, said varnish overflow is led to said drain port means;

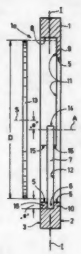
said overflow means including a hole for leading a portion of said varnish in the vicinity of said bottom portion of said varnish pan to said drain port means.

4,589,369

DEVICE FOR HOLDING A SUBSTRATE

Peter Mahler, Hainburg, Fed. Rep. of Germany, assignor to Leybold Heraeus GmbH, Cologne, Fed. Rep. of Germany

Filed Mar. 20, 1985, Ser. No. 714,098
Claims priority, application Fed. Rep. of Germany, Mar. 27, 1984, 3411208
Int. Cl.[4] B05C *13/02*
U.S. Cl. 118—500 **5 Claims**



1. A device for holding a substrate of substantially circular shape comprising;

a plate having at least one substantially circular opening disposed therein, said plate having a partially circular radial groove disposed at an edge of said opening and running parallel to the principal plane of said plate for the insertion of a substrate from one side of said plate, said groove being defined on both sides by rims whose distance apart corresponds to the substrate thickness;

said opening being for the simultaneous bilateral coating of the substrate and extending all the way through said plate, the circumference of said opening having a lower half and an upper half;

one of said rims being on said insertion side of said plate and extending approximately semicircularly over said lower half of said circumference of said opening;

said upper half of said circumference of said opening having on said insertion side a counterbore extending in the direction of the thickness of said plate beyond said groove and offset eccentrically by at least the depth of said groove, the radius of said counterbore being at least as great as the radius of the bottom of said groove; and

the other of said rims being disposed on the opposite side of said plate and extending at least approximately semicircularly over at least said lower half of said circumference of said opening.

4,589,370

MOLLUSC CULTURE

Brendan W. O'Sullivan, Dublin, Ireland; Leo J. Leggett, Salisbury East, and Maxwell V. Melvin, Brighton, both of Australia, assignors to ICI Australia Limited, Melbourne and State of South Australia, Adelaide, both of, Australia

PCT No. PCT/AU82/00047, § 371 Date Aug. 4, 1982, § 102(e) Date Aug. 4, 1982, PCT Pub. No. WO82/03532, PCT Pub. Date Oct. 28, 1982
Continuation of Ser. No. 406,243, Aug. 4, 1982, abandoned. This PCT application Apr. 2, 1982, Ser. No. 750,666
Claims priority, application Australia, Apr. 2, 1982, PE8394
Int. Cl.[4] A01K *61/00*
U.S. Cl. 119—4 **15 Claims**

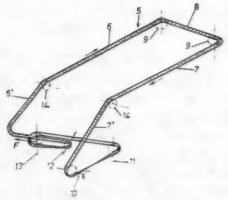
1. A process of cultivating oysters to maturity which comprises placing a bed of discrete oysters at least 4 mm in size in a vessel, flowing a stream of a culture medium upwardly through said vessel so that the flow rate of said stream is at least that required for the said discrete oysters to be kept in incipient suspension and is less than that which causes turbulent movement in the bed, periodically screening the bed of oysters so that the size range variation in the bed is less than 2 mm and continuing said flow through said vessel until the oysters in said vessel reach maturity.

4,589,371

APPARATUS FOR GATHERING EGGS IN BANK OF CAGES FOR CHICKENS

Antonio S. Mas, Carretera de Villaverde a Vallecas, 295, 28031 Madrid, Spain

Filed Nov. 9, 1984, Ser. No. 670,151
Claims priority, application Spain, Nov. 14, 1983, 527259
Int. Cl.[4] A01K *31/16*
U.S. Cl. 119—48 **12 Claims**



1. Apparatus for gathering eggs in banks of cages having exits for chickens with the cages in stages each having two rows, characterized in that a sole endless coupling chain is

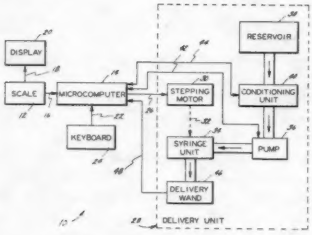
arranged in each stage of the bank, an advancing run of which slides in front of the exits of the cages of one row, while a reverse run slides in front of the exits of the cages of the other row, said two runs being placed in the same horizontal plane; said chain slides on guides fixed to the bank of cages and surrounds said bank along a transverse run in the same plane as said advancing and reverse runs, being supported upon wheels with vertical axes; for a change of direction of said chain along the side opposite said transverse run, said advancing and reverse runs of all of said chains are extended in order to pass through a group of traction and change of direction wheels, said advancing and reverse runs carrying the eggs of all of said chains to arrive at a group of wheels having a common horizontal axis for a change of direction, which causes the reversal of said chains and the discharge upon a same plane receiving the eggs.

4,589,372

DISPENSING SYSTEM HAVING WEIGHT DEPENDENT CONTROL MEANS

Clifford J. Smith, Toledo, Ohio, assignor to The University of Toledo, Toledo, Ohio

Continuation of Ser. No. 483,835, Apr. 11, 1983, abandoned.
This application Mar. 4, 1985, Ser. No. 707,523
Int. Cl.[4] A01K *5/02;* A61M *31/00*
U.S. Cl. 119—51 R **6 Claims**



1. An apparatus for supplying and administering an individual metered dose of a material proportional to the weight of an individual animal subject being administered to comprising, in combination:

scale means for determining the weight of such individual subject and providing a weight signal;

input means for receiving material dose amount per subject weight data;

first control means responsive to said weight signal and said dose per weight data for generating a delivery control signal;

delivery means connected to a supply of the material and responsive to said delivery control signal for supplying an individual dose of the material to the subject; and

second control means for selectively activating said delivery means;

whereby said individual metered dose represents an amount of material which is related to the weight of such individual subject in accordance with said dose per weight data.

4,589,373

WATERING DEVICE FOR FOWL AND SMALL ANIMALS

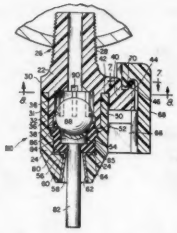
Eldon Hostetler, and Robert D. Hostetler, both of Middlebury, Ind., assignors to Ziggity Systems, Inc., Middlebury, Ind.

Filed Jul. 16, 1984, Ser. No. 631,623
Int. Cl.[4] A01K *7/06, 39/02*
U.S. Cl. 119—72.5 **4 Claims**

1. A watering device for poultry and small animals including a valve housing adapted to be connected to a fluid supply line and having an inlet, an outlet, a valve chamber, a valve seat means within said valve chamber, a valve member within said valve chamber engageable with said valve seat means to restrict fluid flow through said valve chamber, and a valve actuator operably associated with said valve member and including a portion thereof extending through said outlet, comprising:

said valve chamber being formed from first and second telescopically inter-fitting elements, said first telescopically interfitting element including said inlet and said second telescopically inter-fitting element including said outlet; and

said first telescopically inter-fitting element including means



for securing said watering device to said fluid supply line and being releaseably, interchangeably secured to said second telescopically inter-fitting element;

said valve member including a ball element and said valve chamber including interior ridges to guide said ball element, and said first telescopically inter-fitting element including slotted portions adjacent said inlet to prevent inadvertent closing of said inlet by said ball element;

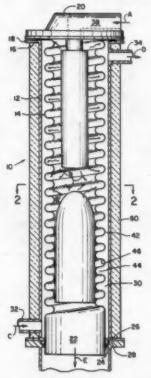
said means for securing said watering device to said fluid supply line including a tapered, threaded tubular stem.

4,589,374

SPIRAL CORRUGATED CORROSION RESISTANT HEAT EXCHANGER

Alfred J. Farina, Baldwin, N.Y., assignor to Thermocatalytic Corp., Williston Park, N.Y.

Filed May 6, 1985, Ser. No. 730,388
Int. Cl.[4] F22B *5/00*
U.S. Cl. 122—14 **1 Claim**



1. A heat exchanger for a radiant heated water boiler comprising a pair of concentrically arranged cylindrical shells, each formed of a single continuous helix extending from one end thereof to the other and closed at each end to define therebetween a chamber for holding water, an inlet for the supply of water to said chamber extending through the outer shell at one

end and an outlet for the discharge of water therefrom at the other end, a combustion element extending into the inner shell from said other end providing a source of heat radiating outwardly therefrom against the inner shell, said inner shell being formed of a corrugated wall, said helix being formed with an angular orientation so that the water in said chamber is caused to flow therein in an upward direction and said radiated source of heat is caused to flow downwardly along the interior surface of said inner shell, and a porous plug arranged in the one end of said inner shell to regulate the exhaust of said heat source therethrough.

4,589,375

STEAM GENERATOR FOR A LIQUID METAL-COOLED REACTOR

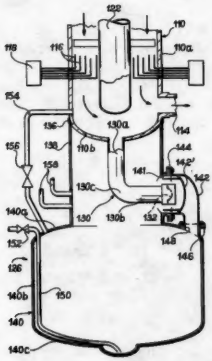
Robert Artaud, Aix en Provence; Michel Aubert, Manosque, and Charley Renaux, Jouques, all of France, assignors to Commissariat a l'Energie Atomique, Paris, France

Filed Apr. 6, 1984, Ser. No. 597,656

Claims priority, application France, Apr. 7, 1983, 83 05693

Int. Cl.[4] F22B *37/42*

U.S. Cl. 122—504 **10 Claims**



1. A steam generator for a liquid metal-cooled reactor, said generator comprises a vertically axed cylindrical envelope, inlet and outlet tubes for the liquid metal with respect to said envelope, a bundle of tubes located within the envelope and in which circulates water, and a drainage tube issuing at the lower end of said envelope and having at least one burster disk able to burst when the pressure prevailing inthe envelope exceeds a given threshold, in order to link the envelope with a drainage tank, wherein the drainage tank is directly fixed to the lower end of the envelope, the drainage tube being located within the tank and carrying at its end the burster disk behind a detachable observation window fixed to the tank.

4,589,376

VAPOR INTRODUCTION SYSTEM FOR INTERNAL COMBUSTION ENGINE

Robert V. Albertson, 2100 Shadywood Rd., Wayzata, Minn. 55391

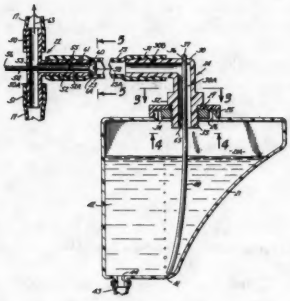
Division of Ser. No. 402,055, Jul. 26, 1982, Pat. No. 4,511,119. This application Oct. 15, 1984, Ser. No. 661,065

Int. Cl.[4] F02M *25/02;* F02D *19/00*

U.S. Cl. 123—25 L **11 Claims**

1. An apparatus useable with an internal combustion engine having a fuel intake means, means enclosing the valves, and hose means connecting the means enclosing the valves and fuel intake means whereby air and engine gases are drawn from the means enclosing the valves to the fuel intake means, windshield washer means having a tank for storing windshield washing liquid, said tank having a fill opening, and cap means mounted on the fill opening to close the opening comprising:

a tubular member having a first section extended through a hole in the cap means, means mounting the first section on the cap means, an elongated tube mounted on the tubular member extended through said first section, said tube having a length to extend adjacent the bottom of said tank, T-connector means adapted to be interposed in the hose



means, tubular means connecting the tubular member with the T-connector means to carry air and vapors from the first member to the T-connector means, and valve means mounted on the T-connector means for controlling the flow of air and vapors through the T-connector means, said valve means being adjustably mounted on the T-connector whereby the flow of air and vapors can be regulated.

4,589,377

ENGINE

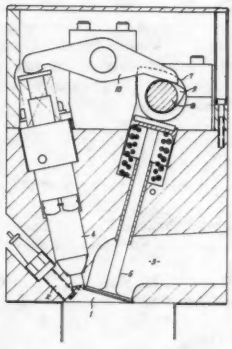
David J. Van Dal, West Perth, Australia, assignor to Michael J. Quinsee and John Eller, both of West Perth, Australia

Continuation of Ser. No. 296,207, Aug. 25, 1981, abandoned. This application Aug. 6, 1984, Ser. No. 637,691

Claims priority, application Australia, Aug. 27, 1980, PE5286; Feb. 23, 1981, PE7717

Int. Cl.[4] F02D *19/00*

U.S. Cl. 123—25 C **9 Claims**



1. An internal combustion engine of the spark ignition or compression ignition type wherein each combustion chamber is fitted with an injector through which a quantity of water or other non-fuel material is injected into the combustion chamber, said engine comprising:

(i) a piston and cylinder having a combustion chamber

wherein the compression ratio of the engine is greater than that normally acceptable for the fuel used in the engine;

(ii) injection means for adding to the combustion chamber an amount of water or other non-fuel material sufficient to maintain the maximum and mean temperatures of combustion at a selected level below the uncontrolled temperatures;

(iii) wherein the addition is made after the fuel/air change has been ignited but prir to self-ignition of the end gas, and is initiated prior to the piston reaching the top dead center position; and

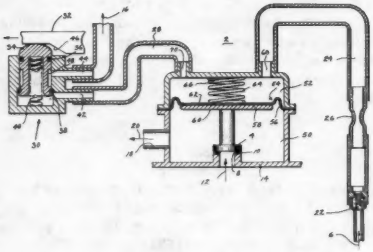
(iv) wherein the air entering the combustion chamber is limited such that the volumetric efficiency of the engine is significantly lower than that normally acceptable for such an engine and the volumetric efficiency of the air intake is maintained between approximately 0.4 and 0.5.

4,589,378

PRESSURE-VACUUM AIDED VALVE

James M. Hundertmark, Fond du Lac, Wis., assignor to Brunswick Corp., Skokie, Ill.

Filed Jan. 9, 1985, Ser. No. 689,914
Int. Cl.[4] F01P *7/14*
U.S. Cl. 123—41.02 **10 Claims**



1. In a two cycle internal combustion engine having a water or the like cooling system, a water valve operated by engine crankcase pressure to a closed condition preventing discharge of water from the engine block, thus enabling the engine to warm up, and operated by engine manifold vacuum to an open condition permitting discharge of water from the engine block for increased cooling, wherein said crankcase pressure is continually provided to said water valve, and wherein manifold vacuum is selectively provided to said water valve through a throttle controlled valve.

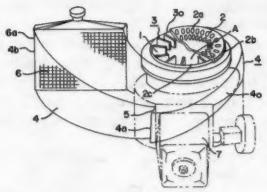
4,589,379

COOLING APPARATUS FOR WATER-COOLED ENGINES

Tetsuzo Fujikawa, Kobe, and Shinichi Tamba, Kakogawa, both of Japan, assignors to Kawasaki Jukogyo Kabushiki Kaisha, Kobe, Japan

Filed Oct. 22, 1984, Ser. No. 663,207
Claims priority, application Japan, Oct. 24, 1983, 58-198788
Int. Cl.[4] F01P *11/10*
U.S. Cl. 123—41.49 **6 Claims**

1. Cooling apparatus for a water-cooled internal combustion engine including a shaft that rotates when the engine is running, said apparatus comprising a centrifugal fan adapted to be connected to and rotated by said shaft, said fan having an intake air port and a discharge air opening, a rotary screen adapted to be operatively connected to and rotated by said shaft, said screen being disposed in said intake air port, a cooling radiator, a spiral-shaped duct connecting said radiator with said discharge air opening, and separating means on said duct,



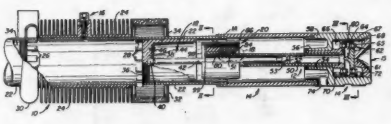
said separating means comprising an opening formed in the outer wall of said duct.

4,589,380

CYCLIC DWELL ENGINE

George L. Coad, Lafayette, Calif., assignor to Avalon Research, Oakland, Calif.

Division of Ser. No. 515,390, Jul. 20, 1983, Pat. No. 4,491,095.
This application Jul. 9, 1984, Ser. No. 628,829
Int. Cl.[4] F02B *71/04;* **F15B** *15/26*
U.S. Cl. 123—46 R **17 Claims**



1. A method for operating a piston engine having an engine cylinder, at least one piston means mounted for reciprocation movement in said engine cylinder, means operated by said engine piston means for extracting kinetic energy from said piston means, and means for releasably restraining said engine piston means at any position within said cylinder after said energy has been extracted, said method comprising the steps of;

(a) forcing said engine piston means in a first direction within said engine cylinder to initiate compression within said engine cylinder,

(b) during said compression step introducing a combustible fuel into said engine cylinder to establish conditions that will cause combustion of said mixture and impart to said piston means kinetic energy in an opposite direction to said first direction from the energy of said combustion,

(c) extracting said energy from said pistons means until said engine piston has come to zero velocity in said opposite direction and become substantially stationary at any position within said engine cylinder,

(d) providing a force on said piston means tending to drive said piston means in said first direction into compression,

(e) releasably restraining said engine piston at said any position within said engine cylinder to restrain said first direction movement into compression,

(f) releasing said releasable restraining means when at least a portion of said extracted energy has been consumed,

(g) and intermittently repeating a series of steps (a) through (f) as further energy is demanded after consumption of said at least a portion thereof.

4,589,381
INTAKE SYSTEM FOR INTERNAL COMBUSTION ENGINE

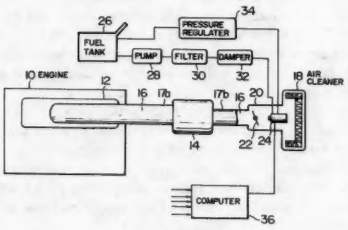
Teruo Takayama, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Sep. 26, 1984, Ser. No. 654,456

Claims priority, application Japan, Sep. 28, 1983, 58-178043; Mar. 2, 1984, 59-38585

Int. Cl.[4] F02B *27/02*

U.S. Cl. 123—52 M **16 Claims**



1. An intake system for an internal combustion engine having cylinders and intake ports extending therefrom, the intake system including an induction passage which extends from an outlet of an air cleaner to an upstream end of an intake manifold having an upstream end and branched downstream ends connected to the intake ports said intake manifold being disposed on the engine at a position which is not higher than a top surface of the engine, a fuel injector having a longitudinal axis is disposed in said induction passage, a throttle valve is disposed in said induction passage downstream of said fuel injector, wherein said induction passage extends substantially horizontally and said fuel injector disposed such that the longitudinal axis thereof extends substantially horizontally in a vicinity of a longitudinal axis of said induction passage.

4,589,382
V-TYPE MULTICYLINDER INTERNAL COMBUSTION ENGINE

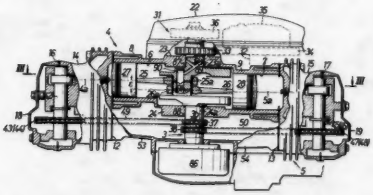
Masaharu Tsuboi, Sayama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 10, 1983, Ser. No. 456,692

Claims priority, application Japan, Jan. 8, 1982, 57-1420; Jan. 8, 1982, 57-1419

Int. Cl.[4] F01L *1/46*

U.S. Cl. 123—90.31 **2 Claims**



1. In a V-type multicylinder internal combustion engine for vehicles comprising front and rear cylinder blocks arrayed in V shape longitudinally of a vehicle body, front and rear cylinder heads fixed on each cylinder block, pistons sliding in the cylinder blocks, a crank and transmission case formed uniformly on the cylinder blocks, a crankshaft extending transversely of the vehicle body borne rotatably on both side walls of the crank and transmission case at journals on both sides, said crankshaft being coupled to the pistons at a crank pin through connecting rods and provided with front and rear driving sprockets, front and rear cam shafts mounted rotatably on the cylinder heads with driven sprockets fixed thereon, a front timing chain laid between the front driving sprocket and the front driven sprocket and constituting together with said front driving and driven sprockets a front cam driving means, a rear timing chain laid between the rear driving sprocket and the rear driving sprocket and constituting together with said rear driving and driven sprockets a rear cam driving means, and a speed change gear coupled to the crankshaft by way of a primary reduction gear and a clutch, the front and rear cylinder blocks being so located as to have their longitudinal center lines offset from each other in the transversal direction of the vehicle body, the improvement comprises that the front cylinder block has a longitudinal center line disposed offset relative to a longitudinal center line of the rear cylinder block toward one lateral side of the vehicle body along an axis of the crankshaft, said primary reduction gear and said clutch being disposed on said one lateral side relative to the cylinder blocks, said front and rear cam driving means are disposed on an opposite lateral side of the vehicle body to said one side relative to the cylinder blocks, the offset location of the front cylinder block relative to the rear cylinder block leaving a space on said one lateral side rearwardly of the front cylinder block for mounting of said clutch and leaving another space on said opposite side frontwardly of said rear cylinder block for mounting of said front cam driving means, the rear cam driving means being disposed on that opposite side outside the front cam driving means.

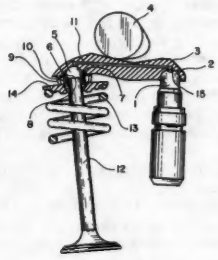
4,589,383
SQUEEZE FILM ROCKER TIP

Merle R. Showalter, Madison, Wis., assignor to Automotive Engine Associates, Madison, Wis.

Filed Jun. 9, 1983, Ser. No. 502,574

Int. Cl.[4] F01L *1/46*

U.S. Cl. 123—90.36 **2 Claims**



1. A valve stem and rocker connector assembly for reducing side loads produced by the valve stem on the valve stem guides wherein the rocker is oscillated in timed sequence for valve operation, said assembly comprising a valve stem having an upper portion with a flat end opposite the valve end, a valve spring retainer mounted on the valve stem adjacent the flat end, a valve spring surrounding said stem and engaging the valve spring retainer, a spherical piece having a flat portion fitting against the flat end of the valve stem, a rocker having an end portion with a concave section conforming to and receiving a spherical portion of the piece therein; means for retaining the spherical piece in the concave section of the rocker,

means to lubricate the coacting surfaces of the rocker and the spherical piece,

spring means positioned between and in engagement with the confronting surfaces of the rocker and the valve spring retainer to produce a force separating the flat section of the spherical piece and the flat end of the valve stem whereby separation of said flat surfaces takes place when the valve is closed, and lubricating reservoir means pro-

viding oil for establishing an oil film between the two flat surfaces during said separation.

4,589,384
ROCKER ARM LIFTER ASSEMBLY
Vern D. Ott, 1839 Rt. 746 S., Cardington, Ohio 43315
Filed Aug. 14, 1984, Ser. No. 640,756
Int. Cl.[4] F01L *1/14, 1/24*
U.S. Cl. 123—90.55 **9 Claims**

1. A valve lifter assembly comprising a housing, two pushrod lifter assemblies accommodated in said housing, and two pushrods one engaged with each of said pushrod lifter assemblies, said housing comprising a flange having first, second and third edges, said first and third edges lying on opposed sides of said flange and said second edge connecting said first and third edges, and first and second hollow cylindrical sections integral with an extending through said flange, said first cylindrical section adjacent said first edge of said flange and said second cylindrical section lying adjacent said third edge of said flange, said housing having walls defining an oil inlet in the underside of said flange between said first cylindrical section and said first edge of said flange, said housing also having walls defining:

a first conduit extending upwardly from said oil inlet into said flange;

a second conduit extending from said first conduit to said second edge of said flange;

a third conduit extending from said second conduit to said third edge of said flange;

a fourth conduit extending from the upper face of said flange to the interior of said first hollow cylindrical section, said fourth conduit intersecting at least one of said second and third conduits; and

a fifth conduit extending from the upper face of said flange to the interior of said second hollow cylindrical section, said fifth conduit intersecting said third conduit,

said housing being provided with plugging means (1) which block said second conduit between its intersection with said third conduit and said second edge of said flange, (2) which block said third conduit between its intersection with said fifth conduit and said third edge of said flange, (3) which block said fourth conduit between said upper surface of said flange and its intersection with said at least one of said second and third conduits, and (4) which block said fifth conduit between said upper surface of said flange and its intersection with said third conduit,

one of said pushrod lifter assemblies being slidably disposed within each of said two cylindrical sections of said housing, and each of said pushrod lifter assemblies comprising:

a body member having, at its lower end, a bearing surface for engaging a cam, said body member having walls defining a socket closed at its base but open to the upper end of said body member;

a hydraulic lifter slideably disposed within said socket, said hydraulic lifter comprising a hollow cylinder member closed at its lower end and disposed at the lower end of said hydraulic lifter so as to define a chamber between the lower end of said hollow cylinder member and the lower end of said socket, said hollow cylinder having walls defining a conduit extending from said chamber to the interior of said hollow cylinder member, a check valve disposed in said conduit and arranged to permit fluid flow from said chamber via said conduit into said interior of said hollow cylinder member but not in the reverse direction; and a piston slideably received within and closing the upper end of said hollow interior of said hollow cylinder member;

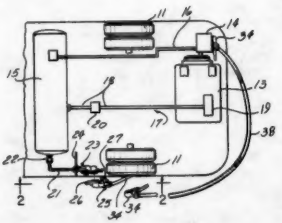
biasing means for biasing said lower end of said hollow cylinder member away from said lower end of said socket;

means for supplying oil to said chamber; and

a cap member slidably mounted on said piston of said hydraulic cylinder, said cap member being provided with a socket in which in received the lower end of one of said pushrods,

each of said pushrods comprising a shaft having at its one end walls defining an internally screw-threaded socket, an adjusting member having a screw-threaded section extending from its one end, said screw-threaded section being engaged with said socket so that said one end of said adjusting member can be screwed into and out of said socket, thereby enabling the length of said pushrod to be adjusted, said adjusting member having , at its opposed end, a non-threaded section having a bearing surface engaged with the socket of the cap member of its associated pushrod lifter assembly, said threaded section of said adjusting member having a pair of substantially flat, parallel surfaces on opposed sides thereof so that said flat, parallel surfaces can be grasped by a wrench and said adjusting member rotated by said wrench, and a locknut engaged with said screw-threaded section of said adjusting member so as to be capable of being abutted against the lower end of said shaft, thereby locking said adjusting member in position relative to said shaft.

4,589,385
AIR JUMP START SYSTEM
Ebert H. Kettler, 4380 Baza, Leonard, Mich. 48038
Filed Mar. 11, 1985, Ser. No. 710,712
Int. Cl.[4] F02N *7/00*
U.S. Cl. 123—179 F **7 Claims**



1. An apparatus for jump starting the internal combustion engine of a motor vehicle equipped with an air starter comprising in combination:

An engine air pressure starter tank mounted on said motor vehicle;

A tire carried by said vehicle having an inflation valve;

starter tank air inlet means connected in fluid relationship with

said tank including a check valve member connected in fluid relationship to said tank, said check valve member normally biased in closed position to prevent air under pressure from discharging from said tank, and operable to be opened to allow pressurized air to enter said tank, and a first air inlet hose coupling connected in closed fluid communication with said check valve member;

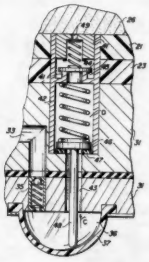
and starter tank air recharging means including a second hose coupling sealingly connected releasably in fluid relation to said first hose coupling, a length of flexible tubing connected in sealed air tight relation to said first hose coupling at one end thereof, and a coupling sealingly connected at the other end of said tubing operable to be sealingly connected to the inflation valve of said tire and to compress the valve stem thereof to open said inflation valve to allow pressurized air from said tire to enter said air starter tank through said check valve.

4,589,386

CARBURETOR PRIMING SYSTEM FOR INTERNAL COMBUSTION ENGINES

Robert G. Everts, Chandler, Ariz., assignor to Inertia Dynamics Corp., Chandler, Ariz.

Filed Apr. 4, 1985, Ser. No. 719,991
Int. Cl.[4] F02M *1/16*
U.S. Cl. 123—187.5 R **1 Claim**



1. A carburetor priming system for an internal combustion engine, said engine including

a fuel tank,

a carburetor having

an air inlet,

a fuel-air mixing throat, and

an air-fuel mixture outlet communicating with the combustion chambers of said engine,

said priming system comprising, in combination:

(a) a hollow housing having air inlet openings in the walls thereof, shaped and dimensioned to cover the air inlet of said carburetor;

(b) an air-permeable wick retained in said housing;

(c) priming fuel pump means, including

(i) a depressable hollow resilient priming bulb,

(ii) a priming fuel supply conduit extending between said fuel tank and the interior of said priming bulb,

(iii) a priming fuel discharge conduit extending between the interior of said priming bulb and said wick,

(iv) a normally closed first check valve in said priming fuel supply conduit which opens to permit fuel to flow into said priming bulb and which closes when said priming bulb is depressed,

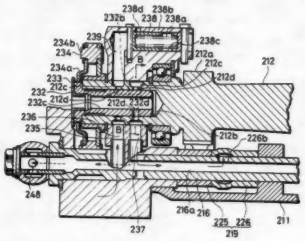
(v) a normally closed second check valve disposed in said priming fuel discharge conduit, said second check valve being mechanically actuated by external pressure on said priming bulb, to open when said priming bulb is depressed.

4,589,387

VALVE OPERATING DEVICE WITH STOPPING FUNCTION FOR INTERNAL COMBUSTION ENGINE

Seishi Miura, Saitama, and Takaaki Tsukui, Tokyo, both of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 2, 1985, Ser. No. 751,170
Claims priority, application Japan, Jul. 2, 1984, 59-136949; Aug. 13, 1984, 59-168948
Int. Cl.[4] F01L *1/34*
U.S. Cl. 123—198 F **3 Claims**



1. A valve operating device having a stopping function in an internal combustion engine, comprising: a cam shaft supported by a cylinder head and rotated in association with rotation of a crankshaft; and a rocker arm rockably mounted on a rocker shaft supported by said cylinder head to open and close an intake or exhaust valve following rotation of a cam mounted on said cam shaft, said rocker arm having an oil-pressure-operated control mechanism which stops the operation of said intake or exhaust valve according to operating conditions of said engine, in which:

a cam shaft passage is formed in an oil pressure supplying passage extending from an oil pressure source through an oil passage in said rocker shaft to said control mechanism in such a manner that said cam shaft passage passes through one end portion of said cam shaft,

a changeover valve for opening and closing said cam shaft passage is provided at said one end portion of said cam shaft, and

a centrifugal governor is provided at said one end portion of said cam shaft in such a manner that said centrifugal governor rotates with said cam shaft and turns changeover valve when the speed of said cam shaft is in a predetermined range, thereby to communicate said oil pressure source with said control mechanism.

4,589,388

INTERNAL COMBUSTION ENGINE

John W. Fenton, 26 Shoreland Dr., Angler's Park Shores, Key Largo, Fla. 33037

Filed May 17, 1985, Ser. No. 735,389
Int. Cl.[4] F02B *53/00*
U.S. Cl. 123—241 **14 Claims**

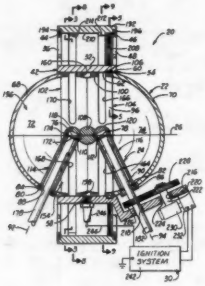
1. An internal combustion engine, comprising:

a housing including at least one lobe having a lobe inner surface symmetrically disposed about a lobe axis and conforming to a portion of a spherical surface centered on a lobe center disposed on the lobe axis, wherein a drive shaft aperture intersecting the lobe inner surface is formed through the housing along a drive shaft axis extending radially from the lobe center at an angle to the lobe axis;

a vane support ring mounted in the housing to extend circularly about the lobe axis for rotation about the lobe axis;

a vane mounted on the vane support ring for pivotation about a selected diameter of the vane support ring passing through the lobe center, the vane having a sealing surface formed thereon to mate with the lobe inner surface and the sealing surface extending arcuately about the lobe

center between opposite ends of said selected diameter of the vane support ring, wherein the vane support ring is characterized as including means for blocking fluid communication between opposite sides of the vane such that the vane divides the interior of the lobe into a first combustion chamber to one side of the vane and a second combustion chamber to the other side of the vane, wherein an intake slot and an exhaust slot are formed through each side of the vane support ring, to either side of said selected diameter, to open into one of said combustion chambers, the inlet slot opening into one combustion chamber being axially aligned with the inlet slot opening into the other combustion chamber and the exhaust slot opening into one combustion chamber being axially



aligned with the exhaust slot opening into the other combustion chamber, and wherein an inlet port is formed through the housing in axial alignment with each of said inlet slots and an outlet port is formed through the housing in axial alignment with each of said exhaust slots;

a drive shaft passing through the drive shaft aperture and pivotally connected to the vane for pivotation relative thereto about an axis passing through the lobe center normally said selected diameter of the vane support ring;

valving means for opening and closing said inlet port and said outlet port for selected angular positions of the vane support ring about the lobe axis; and

ignition means for initiating combustion of fuel in one of said combustion chambers for pre-selected angular positions of the vane support ring about the lobe axis.

4,589,389

FUEL INJECTION CONTROL APPARATUS FOR INTERNAL COMBUSTION ENGINES

Tokuo Kosuge, Nakamachi, and Kimiji Karino, Katsuta, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

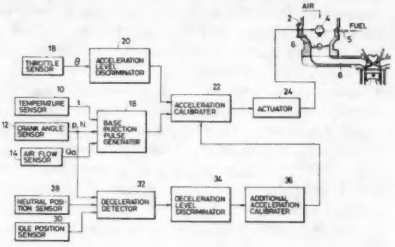
Filed Jun. 12, 1985, Ser. No. 743,977

Claims priority, application Japan, Jun. 15, 1984, 59-121828

Int. Cl.[4] F02D *41/10*

U.S. Cl. 123—326 **4 Claims**

1. A fuel injection control apparatus for an internal combustion engine, in which the base amount of an fuel to be injected is regulated by a base injection pulse obtained in accordance with fundamental parameters representing the operational condition of the engine, and it is reduced to an extremely low level or substantially zero when the engine is decelerated and, upon a re-acceleration succeeding the deceleration, calibrated by an acceleration enrichment determined by a level of the re-acceleration, characterized by an additional acceleration enrichment means for further calibrating the amount of the fuel



to be injected in response to the level of the deceleration preceding to the re-acceleration.

4,589,390

AIR-FUEL RATIO FEEDBACK CONTROL METHOD FOR INTERNAL COMBUSTION ENGINES

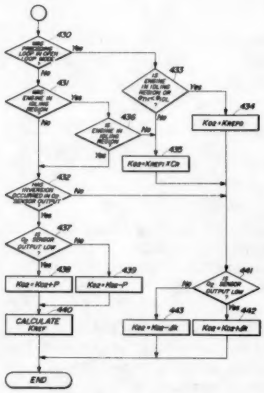
Yoshio Wazaki; Akihiko Koike, and Yuzuru Koike, all of Utsunomiya, Japan, assignors to Honda Giken Kogyo K.K., Tokyo, Japan

Filed May 1, 1985, Ser. No. 729,367

Claims priority, application Japan, May 2, 1984, 59-88884

Int. Cl.[4] F02M *51/00*

U.S. Cl. 123—339 **2 Claims**



1. A method of effecting feedback control of the air-fuel ratio of an air-fuel mixture being supplied to an internal combustion engine having an exhaust pipe and an exhaust gas ingredient concentration detecting means arranged in said exhaust pipe, by correcting a basic fuel supply quantity by the use of a coefficient variable in value in response to the output of said exhaust gas ingredient concentration detecting means, while said engine is operating in a predetermined air-fuel ratio feedback control effecting region, the method comprising the steps of: (1) previously dividing said predetermined air-fuel ratio feedback control effecting region into at least first and second subdivided regions; (2) determining whether or not said engine is operating in one of said first and second subdivided regions; (3) calculating and storing a first mean value of values of said coefficient which have been applied in the feedback control effected when said engine is operating in said first subdivided region, while calculating and storing a second mean value of values of the coefficient which have been ap-

plied in the feedback control effected when said engine is operating in said second subdivided region; (4) initiating the air-fuel ratio feedback control by using said first mean value as an initial value of said coefficient, when it is detected that the operation of said engine has entered said first subdivided region; and (5) initiating the air-fuel ratio feedback control by using said second mean value as an initial value of said coefficient, when it is detected that the operation of said engine has entered said second subdivided region.

4,589,391

CONTROLLING DEVICE FOR THE START OF INJECTION IN AN INTERNAL COMBUSTION ENGINE OPERATING WITH SELF-IGNITION

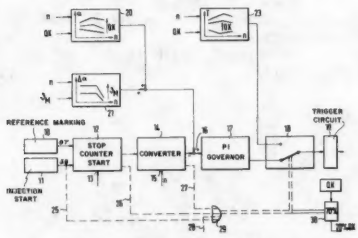
Albrecht Sieber, Böblingen, and Joachim Wawretzko, Stuttgart; both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Sep. 13, 1982, Ser. No. 417,733

Claims priority, application Fed. Rep. of Germany, Jan. 27, 1982, 3202614

Int. Cl.⁴ F02M *39/00*

U.S. Cl. 123—357 **6 Claims**



1. A controlling device for the injection start in an internal combustion engine operating with self-ignition having sensors at least for the injection start, actual value of the crankshaft position, load and temperature, a set-point injection start control and a governor for the signal for the difference between the set-point and the actual values, comprising a counter means having a frequency signal input dependent on starting signals for counting the period of time elapsing between the actual value for the injection start and a reference marking relating to the crankshaft position, and means for comparing the output of said counter means with a set-point value for said governor.

4,589,392

ELECTRONIC CONTROL SYSTEM FOR FUEL INJECTION OF A DIESEL ENGINE

Josef Wirz, Stuttgart, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

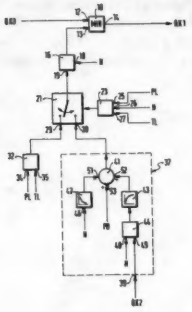
Filed Jan. 17, 1985, Ser. No. 692,927

Claims priority, application Fed. Rep. of Germany, Feb. 16, 1984, 3405495

Int. Cl.⁴ F02M *59/00*

U.S. Cl. 123—357 **5 Claims**

1. An electronic control system for fuel injection in an internal combustion engine, comprising means for sensing operational variables of the engine, a field of characteristics for a smoke discharge limiter, means for interpreting the field of characteristics for the smoke discharge limiter in dependency at least on rotary speed of the engine to produce a signal indicative of mass of supplied fuel, means for generating in dependency on rotary speed and at least one preset additional value a simulation signal indicative of air mass supplied to the engine, means for evaluating the sensed operational variables to detect a correct or an incorrect operational condition of the engine, and controlling means cooperating with the simulation signal generating means and with the evaluating means to adjust the field of characteristics of the smoke discharge limiter in dependency on the supplied amount of air and on momentary operational condition of the engine.



4,589,393

SAFETY DEVICE FOR CONSTANT-PRESSURE INJECTION VALVE OF INTERNAL COMBUSTION ENGINE

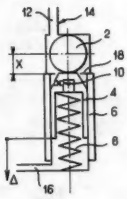
Jean-Pierre Jourde, Lyons, and Marc Miettaux, Decines, both of France, assignors to Regie Nationale des Usines Renault, Boulogne-Billancourt, France

Filed Jan. 16, 1985, Ser. No. 691,886

Claims priority, application France, Jan. 23, 1984, 84 00973

Int. Cl.⁴ F02M *39/00*

U.S. Cl. 123—460 **6 Claims**



1. A safety device for a constant-pressure injection valve of an internal combustion engine having a main fuel supply line, comprising:

means for blocking said main supply line of said valve permanently and definitely upon a maximum admissible amount of injected fuel being exceeded and which further comprises:

a ball;

a piston having a calibrated orifice formed therein and placed in series with said main supply line;

a sleeve for guiding said piston and a return spring positioned within said piston for biasing said piston such that, on the one hand, said piston travels, during each fuel injection, a distance varying as a function of the amount of fuel delivered and returned to a rest position between two successive fuel injections by the action of said spring and, on the other hand, said ball blocks said sleeve as soon as travel of said piston reaches a preset value corresponding to a maximum admissible fuel injected amount.

4,589,394
INJECTION TIMING CONTROL DEVICE IN A DISTRIBUTOR-TYPE FUEL INJECTION PUMP

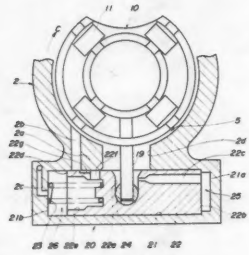
Satoru Ito, Higashimatsuyama, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed May 24, 1985, Ser. No. 738,075

Claims priority, application Japan, May 28, 1984, 59-78446[U]

Int. Cl.⁴ F02M *59/20*

U.S. Cl. 123—502 **3 Claims**



1. A distributor-type fuel injection pump for an internal combustion engine, comprising: a pump housing; a suction space defined within said pump housing and filled with fuel having a pressure variable as a function of the rotational speed of the engine; a timer piston displaceable in response to a change in said fuel pressure; means for controlling the fuel injection timing of said fuel injection pump in response to displacement of said timer piston; and drain passage means partly formed in said timer piston for permanently communicating said suction space with a zone under a lower pressure, said drain passage means having a restricting portion disposed to restrict the flow rate of fuel flowing therethrough from said suction space to said zone under a lower pressure when said timer piston is positioned within a region corresponding to a particular rotational speed region of said engine.

4,589,395
FUEL SYSTEM FOR INTERNAL COMBUSTION ENGINES

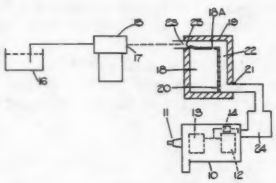
Colin T. Timms, Harrow Weald, and James H. Garrod, London, both of England, assignors to Lucas Industries public limited company, Brimingham, England

Filed Dec. 12, 1983, Ser. No. 560,511

Claims priority, application United Kingdom, Dec. 24, 1982, 8236748

Int. Cl.⁴ F02M *29/00*

U.S. Cl. 123—516 **5 Claims**



1. A fuel system for an internal combustion engine comprising a fuel pumping apparatus incorporating high and low pressure pumps, a fuel filter unit through which fuel is drawn by the low pressure pump from a fuel supply tank, the fuel being supplied by the low pressure pump to the high pressure pump, a body defining inner and outer hollow cylindrical walls and end walls closing the upper and lower ends of said cylindrical walls, a fuel reservoir defined by the inner cylindrical wall, said fuel reservoir chamber being disposed in use, above the pumping apparatus and having a restricted outlet defined in said inner cylindrical wall adjacent the lower end thereof, said restricted outlet communicating with the annular space defined between said cylindrical walls, an outlet for connection to the pumping apparatus adjacent the lower end of said outer cylindrical wall to put said restricted outlet in communication with the inlet of the low pressure pump, and an inlet for connection to the fuel filter unit adjacent the upper end of said outer cylindrical wall and an inlet to the reservoir chamber adjacent the upper end of said inner cylindrical wall to maintain said chamber full of fuel during use of the apparatus.

4,589,396
SUPERCHARGER CONTROL IN AUTOMOBILE ENGINE SYSTEM

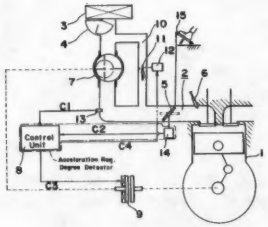
Takashige Tokushima, Higashihiroshima; Kingo Okitsu, Hiroshima; Yoshiyuki Mochizuki, Hiroshima, and Kouji Tsuji, Hiroshima, all of Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan

Filed Jul. 17, 1985, Ser. No. 755,721

Claims priority, application Japan, Jul. 20, 1984, 59-151837; Jul. 20, 1984, 59-151836

Int. Cl.⁴ F02D *23/00*

U.S. Cl. 123—559 **9 Claims**



1. A supercharger control in an automobile engine which comprises, in combination:

an intake passage for the introduction of air to the engine;

an air pump disposed in the intake passage for supercharging air flowing therethrough towards the engine;

a bypass passage bypassing only the air pump;

a control valve disposed in the bypass passage for controlling the effective cross-sectional area of the bypass passage;

a pump drive means;

means for causing the control valve to reduce the effective cross-sectional area of the bypass passage during the operation of the air pump;

a load detector for detecting, and generating a load signal indicative of, the load on the engine;

a control means responsive to the load signal, when the load on the engine increases, for activating the pump drive means to operate the air pump when the load on the engine exceeds a predetermined value;

means for detecting the degree of requirement for acceleration; and

means operable in response to an output from the detecting means to vary a pump operating load, at which the air pump is to be operated, in such a way as to render the pump operating load to be lower in the case where the degree of requirement for acceleration is great than in the case where the degree of requirement for acceleration is small.

4,589,397

APPARATUS FOR ADAPTING TO GASES OF DIFFERENT CALORIFIC VALUES IN THE SUPPLY OF GAS-AIR MIXTURE TO GAS ENGINES

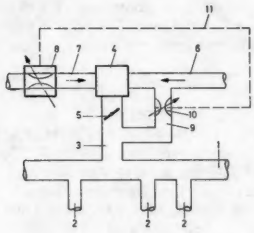
Leo Stankewitsch, Ilvesheim, Fed. Rep. of Germany, assignor to Motoren-Werke Mannheim Aktiengesellschaft vorm, Benz Abt, stationärer Motorenbau, Mannheim, Fed. Rep. of Germany

Filed Jul. 25, 1984, Ser. No. 634,393

Claims priority, application Fed. Rep. of Germany, Aug. 1, 1983, 3327699

Int. Cl.[4] F02M *29/00*

U.S. Cl. 123—590 4 Claims



1. An apparatus for adapting to gases of different calorific values in the supply of gas-air mixture to gas engines, comprising a gas line having a gas pressure regulator and an air line discharge into gas-air mixer and a mixture line leading downstream from the mixer to the intake manifold of the gas engine, a mixture valve being disposed in the mixture line, and

bypass means for supplying excess air to the intake manifold when the gas is of high caloric value and for preventing the supply of excess gas to the intake manifold when the gas is of low caloric value, said bypass means including a bypass line leading from the air line to the mixture line bypassing the gas-air mixer, and valve means in said bypass line to close said bypass line completely when the gas is of low caloric value and to maintain said bypass line open when the gas is of high caloric value, said valve means comprising a throttle disposed in said bypass line.

4,589,398

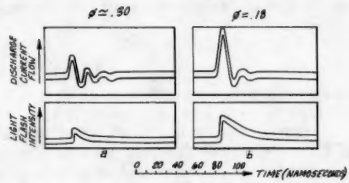
COMBUSTION INITIATION SYSTEM EMPLOYING HARD DISCHARGE IGNITION

Ronald C. Pate, 10263 Rempas Dr., NW., Albuquerque, N. Mex. 87114, and Raymond E. Hensley, 3805 Garcia Northeast, Albuquerque, N. Mex. 87111

Filed Feb. 27, 1984, Ser. No. 583,694

Int. Cl.[4] F02P *1/00*; F23Q *3/00*

U.S. Cl. 123—596 14 Claims



1. A method of initiating combustion of a fuel-air mixture using a discharge device having a pair of spaced apart electrodes between which an electrical discharge channel may be formed, comprising the steps of:

(A) storing a quantity of electrical energy in a low inductance energy storage device;

(B) producing an electrical discharge channel between said electrodes using energy stored in said device, said discharge channel being defined by a damped oscillatory current flow; and

(C) transferring at least approximately 80 percent of the energy stored in said storage device to said discharge channel within the first half period of said current flow.

4,589,399

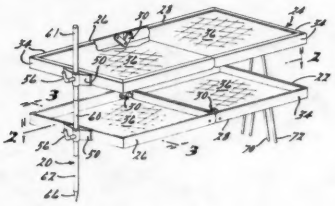
PORTABLE COOKING DEVICE

Stephen D. Hamill, Rte. 1, Box 579B, and Arthur A. Knight, 1200 Avenida Manana, both of Roswell, N. Mex. 88201

Filed Mar. 18, 1985, Ser. No. 712,535

Int. Cl.[4] A47J *37/00*; F24B *3/00*

U.S. Cl. 126—30 7 Claims



1. A portable cooking device comprising

first support means, said support means being comprised of at least two sections which are releasably connected together,

first grate member releasably mounted on said first support means,

first mounting means for mounting said first grate member on said first support means, said first mounting means allowing said first grate member to be positioned at a plurality of points along said first support means and substantially at any angle of orientation around the perimeter thereof,

said first grate member comprising at least two sections, said section being pivotally joined together and adapted to be folded over adjacent one another for compact storage of said first grate member,

second grate member releasably mounted on said first support means,

second mounting means for mounting said second grate member on said first support means, said second mounting allowing said second grate member to be positioned at a plurality of points along said first support means and substantially at any angle of orientation around the perimeter thereof,

said second grate member comprising at least two sections, said sections being pivotally joined together and adapted to be folded over adjacent one another for compact storage of said second grate member, and

second support means for holding and securing said first and second grate members relative to the ground.

4,589,400

SOLAR RAY COLLECTING DEVICE

Kei Mori, 3-16-3-501, Kaminoge, Setagaya-ku, Tokyo, Japan

Filed Sep. 11, 1984, Ser. No. 649,398

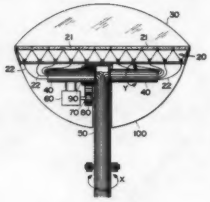
Claims priority, application Japan, Sep. 19, 1983, 58-172773

Int. Cl.[4] F24J *3/02*

U.S. Cl. 126—440 5 Claims

1. A solar ray collecting device comprising a solar ray collecting portion consisting of a large number of lenses arranged on a common plane, optical fibers having light-receiving edges which are precisely positioned at the focus position of the respective lenses means for rotatively supporting said solar ray collecting portion, a horizontal hollow shaft supporting said

supporting means for allowing rotation about a horizontal axis of rotation, a vertical hollow rotating shaft elongated in a direction perpendicular to said horizontal hollow shaft and supporting said horizontal hollow shaft, said vertical shaft being rotatable about a vertical axis of rotation, drive means for rotating said solar ray collecting portion about said horizontal axis of rotation, said solar ray collecting portion unitarily comprising an approximately semicircular arc gear having an axis of rotation coincident with said horizontal axis of rotation, said drive means comprising a bearing means mounting said semicircular arc gear on said horizontal hollow shaft such that said semicircular arc gear is rotatable relative to said horizontal hollow shaft, said drive means further comprising a motor means mounted on said horizontal hollow shaft and a drive gear driven by said motor means and engaging said semicircular arc gear such that said solar ray collecting portion



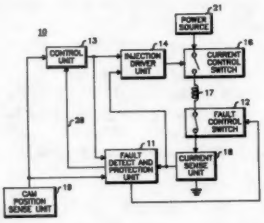
can be directed toward the sun as said drive means rotates said solar ray collecting portion about said horizontal axis of rotation and rotation is effected about said vertical axis of rotation, said horizontal hollow shaft having two longitudinal ends and a horizontal internal passage extending between said two longitudinal ends, said vertical hollow shaft having an upper longitudinal end and a vertical internal passage, said vertical internal passage having a longitudinal axis coincident with said vertical axis of rotation, said vertical hollow shaft being unitarily joined to said horizontal hollow shaft at an intermediate position of said horizontal hollow shaft located between said two longitudinal ends of said horizontal hollow shaft, said optical fibers passing into each of said two longitudinal ends of said horizontal hollow shaft into said horizontal internal passage and then into said upper longitudinal end of said vertical hollow shaft into said vertical internal passage.

4,589,401

INJECTOR DRIVER FAULT DETECT AND PROTECTION DEVICE

Frank Karim, Hanover Park; Howard L. Frank, Skokie, and Nicholas C. Hopman, Roselle, all of Ill., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Apr. 12, 1985, Ser. No. 722,534
Int. Cl.[4] F02P 5/08
U.S. Cl. 123—479 **19 Claims**



1. In a fuel injection system having at least one fuel injection valve for use with an engine, at least one solenoid for controlling said fuel injection valve, a power line operably connected to said solenoid, control means for providing a control signal, injector driver means responsive to said control signal for providing a drive signal, and switch means having selectively variable conductive states and being responsive to said drive signal for selectively closing and opening said power line to thereby control said solenoid, an improvement comprising:

(a) current sense means for sensing current flow through said solenoid and for producing a current sense signal in response thereto;

(b) fault detect means for receiving said current sense signal and said control signal for providing a fault protect signal when said current sense means provides said current sense signal and said control means does not substantially simultaneously provide said control signal; and

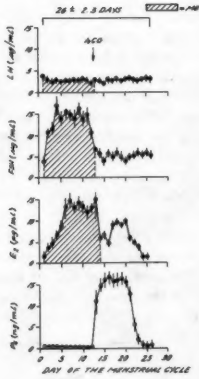
(c) fault protect switch means responsive to said fault protect signal for preventing a flow of current through said solenoid.

4,589,402

METHOD OF IN VITRO FERTILIZATION

Gary D. Hodgen, Potomac, Md.; Howard W. Jones, Jr., and Georgeanna S. Jones, both of Norfolk, Va., assignors to SErono Laboratories, Inc., Randolph, Mass.

Filed Jul. 26, 1984, Ser. No. 634,697
Int. Cl.[4] A61B 19/00
U.S. Cl. 128—1 R **3 Claims**



1. In a method of in vitro fertilization which comprises the initial steps of inducing follicular maturation by administering exogeneous human menopausal gonadotropins to a female, inducing ovulation, harvesting the eggs from large ovarian follicles, combining each ovum with spermatozoa in vitro and transferring the conceptus into the uterus, the improvement which consists of employing FSH alone as said exogeneous human menopausal gonadotropin without the presence of exogeneous LH.

4,589,403

APPARATUS FOR CLEANING AND STERILIZING A GUIDE TUBE FOR A FORCEPS-CONTROL MEMBER OPERATING WIRE IN AN ENDOSCOPE

Teruo Ouchi, Kawagoe; Kazukiyo Tamada, Kawaguchi, and Shiyouichi Yamaka, Kamifukuoka, all of Japan, assignors to Kabushiki Kaisha Medos Kenkyusho, Japan

Continuation of Ser. No. 433,671, Oct. 12, 1982, abandoned. This application Sep. 24, 1984, Ser. No. 653,828
Claims priority, application Japan, Oct. 13, 1981, 56-152523
Int. Cl.[4] A61B 1/00
U.S. Cl. 128—4 **9 Claims**

1. In an endoscope including a manipulator unit and a for-

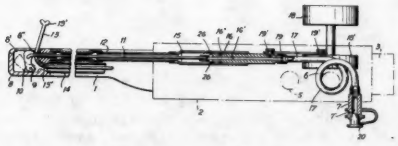
ward elongated insertion portion extending from the manipulator unit, forceps-control means movably mounted in a forward region of the insertion portion for selectively controlling the position of forceps at the forward region of the insertion portion, an operating wire guide tube extending within the insertion portion towards the manipulator unit, and an operating wire extending through and being guided by the wire guide tube having two ends, a first end of said operating wire being connected to the forceps-control means so that the position of the forceps can be controlled from the manipulator unit through displacement of the operating wire which thereby moves the forceps-control means, an apparatus for cleaning and/or sterilizing the operating wire guide tube, comprising:

a control shaft guide tube connected to said wire guide tube in fluid communication therewith;

a tubular control shaft mounted for guided forward and rearward longitudinal movement within said control shaft guide tube in a piston-like manner, said control shaft being connected to the second end of said operating wire which extends through and is guided by the wire guide tube within the forward elongated insertion portion of the endoscope;

sealing means for providing a substantially fluid-tight seal between said tubular control shaft and said control shaft guide tube;

fluid passage means provided in said tubular control shaft communicating with said control shaft guide tube, said fluid passage means comprising a fluid passage formed in said tubular control shaft, one end of said passage opening



rearwardly of said sealing means and the other end of said passage opening forwardly of said sealing means and communicating with said control shaft guide tube;

a flexible tube having two ends, a first end being connected to said tubular control shaft for movement therewith and sealed in fluid communication to said one end of said fluid passage, said flexible tube including a slackened length portion of the form of a looped section of said flexible tube, said looped section of said flexible tube having a particular radial dimension for a respective position of said tubular control shaft, said looped tube section being situated such that movement of said tubular control shaft to which said first end of said flexible tube is connected in a rearward direction causes the dimension of said looped tube section to expand; and

fluid inlet means externally provided on said manipulator unit with the second end of said flexible tube communicating therewith for injecting cleaning fluid or the like into said flexible tube;

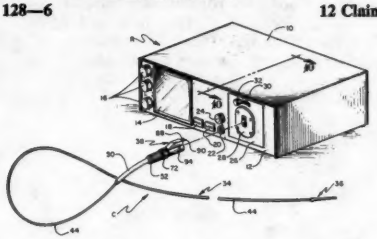
whereby due to the presence of the looped section of the flexible tube, the relative increase in the volume of a tube system including the wire guide tube, the control shaft guide tube situtated forwardly of said sealing means, the fluid passage of said control shaft and the flexible tube as the control shaft is moved in a rearward direction within the control shaft guide tube and the consequent relative decrease in pressure in the tube system caused thereby is significantly less than when the flexible tube does not include the looped section.

4,589,404

LASER ENDOSCOPE

James D. Barath, Parker, Colo., and Steven K. Case, St. Louis Park, Minn., assignors to Medical Dynamics, Inc., Englewood, Colo.

Filed Jan. 3, 1984, Ser. No. 567,800
Int. Cl.[4] A61B *1/06*
U.S. Cl. 128—6 **12 Claims**



1. Apparatus for viewing and/or treatment within body cavities by non-surgical or micro-surgical procedures, said apparatus comprising;

a coherent fiber optical cable whose diameter is micro-thin having a planar distal end for insertion into a body cavity and a planar proximate end;

a single optical fiber, having a distal end adjacent said distal end of said optical cable and a proximate end adjacent said proximate end of said optical cable;

a laser light source alignable with said proximate end of said single fiber to transmit light to said distal end to illuminate the body cavity;

optical lens means at the distal end of said optical cable to focus an image of a portion of the cavity on said distal end of said optical cable for transmission through said optical cable;

optical focus means connectable to said proximate end of said optical cable to focus an image of the portion of the body cavity reflected through said optical cable; and

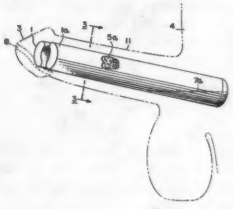
viewing means connected to said focus means for displaying an image of the portion of the body cavity.

4,589,405

THERMAL ACTIVATED PENILE PROSTHESIS

George T. Hemmeter, 4125 Black Point Rd., Honolulu, Hi. 96816

Filed Oct. 12, 1984, Ser. No. 660,216
Int. Cl.[4] A61F *5/00*
U.S. Cl. 128—79 **1 Claim**



1. A penile prosthesis device comprising a pair of sealed tubes, sized and shaped for implantation in the corpora cavernosa of the penis, said tubes made of a thin, supple, hydrocarbon compatible plastic material, with each tube partially filled with either Pentene -2 (C_5H10) or Beta-Amylene (C_5H10), said tubes in the normal state being collapsed and void of air, said tubes being inflated by increasing the temperature of the

hydrocarbon above the boiling point to create a gas pressure within the tube.

4,589,406

ORTHOPAEDIC APPLIANCE FOR USE IN TREATING ACROMIOCLAVICULAR JOINT INJURIES

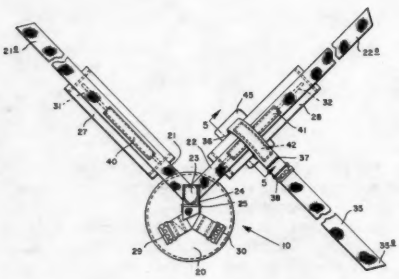
Florian F. Florek, 104 High St., Edinboro, Pa. 16412

Filed Aug. 11, 1983, Ser. No. 521,990

The portion of the term of this patent subsequent to Nov. 6, 2001, has been disclaimed.

Int. Cl.[4] A61F *5/04*

U.S. Cl. 128—87 R 18 Claims



1. For use in treating a patient having an acromioclavicular joint injury wherein the distal end of the patient's clavicle is out of its normal position with respect to the underlying acromion, a splint comprising:

a connector pad adapted to be placed against the patient's spinal column below the base of the neck,

a pair of clavicle straps diverging from said connector pad and having upper portions adapted to extend forwardly over both clavicles and having lower portions extending under both axillae and returning to said connector pad,

means adjustably connecting said lower portions of said straps to said connector pad,

means providing a pressure pad overlying the distal end of the injured clavicle and engaging one of said clavicle straps,

an auxiliary strap disposed along the patient's back between the spinal column and the distal end of the injured clavicle, said auxiliary strap being connected at its upper end to said one clavicle strap adjacent said pressure pad means and being connected at its lower end to the lower portion of said one clavicle strap,

said one clavicle strap cooperating with said auxiliary strap and said pressure pad means to apply pressure in a downward direction to the distal end of the injured clavicle and in an upward and inward direction to the acromion for urging the same together,

whereby the splint applies pressure in a desirable direction to the acromioclavicular joint to promote healing of the same.

4,589,407

SPINE IMMOBILIZER

Michael J. Koledin, El Cajon, and Geoffrey C. Garth, Long Beach, both of Calif., assignors to National Medical Distributors, El Cajon, Calif.

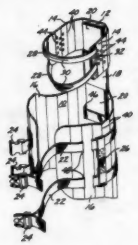
Filed May 9, 1984, Ser. No. 608,377

Int. Cl.[4] A61F *5/04*

U.S. Cl. 128—87 R 13 Claims

1. A spine immobilizer comprising:

a sheet of material including a plurality of longitudinally extending cells defined by a plurality of longitudinally extending walls disposed between outer layers whereby said sheet is relatively light in weight and resistant to longitudinal bending, said sheet further including a central, longitudinally extending spine panel; a pair of head panels extending laterally on opposite sides of said spine panel; a pair of body panels extending laterally on opposite sides of said spine panel said body panels including a pair of longitudinally spaced apart sets of laterally spaced apart, longitudinally extending slots; a pair of stiffener panels in overlying relation each with respect to the other, each of said stiffener panels secured to an opposing edge of said spine panel, said stiffener panels extending laterally on opposite sides of said spine panel and located between said head panels and said body panels; and longitudinally extending stiffening means adjacent to and integral with said spine panel and having a predetermined thickness greater than the thickness of said spine panel so as to be operative to increase the resistance of said spine panel to longitudinal bending, said head panels having laterally spaced apart, longitudinally extending fold lines to facilitate lateral bending of said head panels into adjacent relation with opposite sides of a person's head whereby the free extremeties of said head panels can be secured together to constrain a person's head against lateral move-



ment, said body panels having laterally spaced apart, longitudinally extending fold lines to facilitate lateral bending of said body panels in conforming relation to a person's body to constrain the body against lateral movement, the free extremities of said stiffener panels being secured together in overlying relation to said spine panel to define enclosed spaces forming a box section resistant to longitudinal bending; and

fastening means carried by said body panels and including a pair of cross straps extending through said slots of said sets, respectively, for securement together of the free extremities of said cross straps to secure said body panels in said conforming relation and wherein said stiffening means is secured to and projects above the inner surface of said spine panel, certain of said webbing slots are located adjacent said stiffening means, and said pair of cross straps extends across said stiffening means whereby tightening of said cross straps forms a cross section providing longitudinal stiffening, each said cross section being defined by said stiffening means, said spine panel and adjacent portions of said body panels, and one of said cross straps.

4,589,408

SURGICAL FACE MASK AND HOOD

Wayne J. Singer, Roswell, Ga., assignor to Kimberly-Clark Corporation, Neenah, Wis.

Continuation of Ser. No. 386,446, Jun. 9, 1982, abandoned. This application Aug. 2, 1984, Ser. No. 636,893

Int. Cl.[4] A61F *13/00*

U.S. Cl. 128—132 R 5 Claims

1. A combined surgical face mask and hood comprised of material and forming a head covering adapted to substantially completely surround the head of a wearer except for an opening adapted to lie over the eyes of the wearer and including a face mask portion adapted to cover the mouth and nostrils and provide a filter through which the wearer breaths, said head

covering also being adapted to reach to the neck of the wearer, and further including means for holding the head covering on the wearer with said face mask portion against the wearer's face and in position covering the mouth and nostrils, said head covering material being formed of a laminated material including a layer of substantially continuous, randomly deposited, thermoplastic polymer filaments having a diameter greater than about 12 microns and a mat of thermoplastic polymer microfibers having an average diameter of about 2–4 microns,

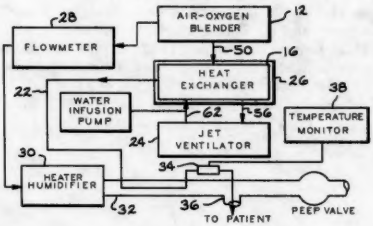
said microfiber mat having a basis weight between about 0.9 ounce/yd^2 and about 1.25 ounce/yd^2, said layer and mat being intermittently bonded together to provide a laminated material having a basis weight between about 1.3 ounce/yd^2 and about 1.7 ounce/yd^2, the combination of said mat and said layer being selected to provide substantially throughout said head covering a combination of bacteria biological efficiency BFE≧95% and air permeability of $\Delta P > 5$ mm, and textile like drape and hand.

4,589,409

HEAT AND HUMIDIFICATION SYSTEM FOR HIGH FREQUENCY JET VENTILATION

Robert L. Chatburn, 3135 E. Derbyshire, Cleveland Heights, Ohio 44118, and Marvin D. Lough, 307 Eastoverlook Dr., Eastlake, Ohio 44094

Filed Oct. 28, 1983, Ser. No. 546,652
Int. Cl.^{4} A61M *16/00*
U.S. Cl. 128—203.26 **3 Claims**



1. An improved method for delivering a mixture of respirable air to a patient comprising the following steps:

blending a supply of gases containing at least air and oxygen;

heating and humidifying a first stream of said air-oxygen mixture;

pressurizing a second stream of said air-oxygen mixture;

heating said second stream of said air-oxygen mixture;

pulsating said heated second stream of said air-oxygen mixture;

injecting water into said heated, pulsating second stream of said air-oxygen mixture;

heating said heated, pulsating second stream of said air-oxygen mixture containing said water such that said water in said heated, pulsating second stream of said air-oxygen mixture is vaporized; and

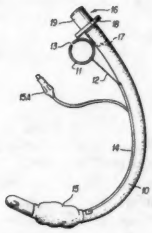
delivering said heated first stream of said air-oxygen mixture and said heated pulsating second stream of said air-oxygen mixture containing said vaporized water to a patient.

4,589,410

ENDOTRACHEAL TUBE

Larry S. Miller, 218 Manchester Manor, Thiboudaux, La. 70301

Filed Jul. 15, 1985, Ser. No. 754,969
Int. Cl.^{4} A61M *16/00*
U.S. Cl. 128—207.15 **1 Claim**



1. An apparatus for the rapid intubation of the trachea comprising

a hollow solid walled open ended plastic endotracheal tube having a connector tip at one end and being open and variably curvable at the other end for insertion directly into the trachea,

an inflatable balloon carried externally of said tube proximate the open end,

a syringe adapter for administering gas into the balloon extending externally of said hollow tube in the region of the connector tip end and being in gaseous communication with the balloon at the remote end of said tube for inflating same after insertion of the tube into the trachea,

a closed tunnel externally of the solid walled tube having a closed end and an open end for selectively imparting a curl to the tube,

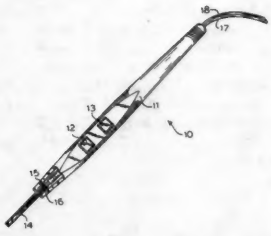
said external tunnel extending from above the balloon to proximate to connector tip, a pull cord within said external tunnel having one end fused to the outside of the endotracheal tube over an area greater than the width of said tunnel and having its free end releasably connected to a split ring to permit removal of the ring upon completion of intubation.

4,589,411

ELECTROSURGICAL SPARK-GAP CUTTING BLADE

Aaron Friedman, 45 Stonegate Dr., Wethersfield, Conn. 06109

Filed Feb. 8, 1985, Ser. No. 699,664
Int. Cl.^{4} A61B *17/36*
U.S. Cl. 128—303.14 **13 Claims**



1. A spark-gap cutting blade for an electrosurgical active electrode pencil which comprises:

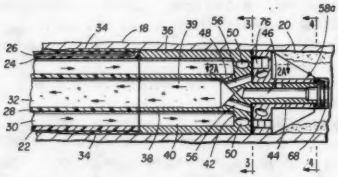
(a) a central electrode terminating in an exposed first electrically conductive element;
(b) an insulator surrounding the central electrode except the first electrically conductive element;
(c) a series of electrically insulative elements alternating with electrically conductive elements disposed upon the insulator surrounding the central electrode, said series of insulative and conductive elements forming, together with the first electrically conductive element, a spark-gap cutting surface;
(d) an electrical connector connecting the central electrode to one side of a high voltage source; and;
(e) an electrical connector connecting the last electrically conductive element in the series of alternating insulative and conductive elements to the other side of a high voltage source.

4,589,412

METHOD AND APPARATUS FOR SURGICALLY REMOVING REMOTE DEPOSITS

Kenneth R. Kensey, Chicago, Ill., assignor to Intravascular Surgical Instruments, Inc., Downingtown, Pa.

Filed Jan. 3, 1984, Ser. No. 567,506
Int. Cl.[4] A61B *17/32*
U.S. Cl. 128—305 **13 Claims**



1. A method of opening a restriction formed of material inside of a blood vessel, duct, or other lumen within a living being, said method comprising: guiding a flexible catheter, whose outside diameter is close to the inside diameter of the vessel, duct or lumen and having a longitudinal axis and movable working means located at a distal end portion thereof, through the blood vessel, duct, or lumen to the location of the material; applying fluid pressure directly to a portion of said working means to cause said portion to rotate about said axis; and advancing the catheter down said blood vessel, duct, or lumen so that it can flex to conform to the tortuosity of said vessel, duct, or lumen and move into said material while said portion of said working means is rotating to effect the opening of said restriction without appreciable damage to said passageway.

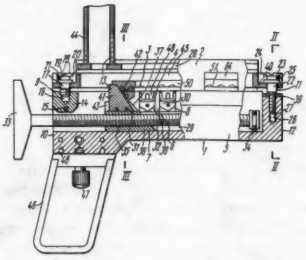
4,589,413

SURGICAL INSTRUMENT FOR RESECTION OF HOLLOW ORGANS

Boris N. Malyshev, ulitsa Butlerova, 24, kv. 219; Viktor A. Saljuk, Teply stan, 1 Mikroraion, 7, kv. 153; Oleg X. Skobelkin, ulitsa Vesnina, 30, kv. 27; Evgeny I. Brekhov, ulitsa Marshala Timoshenko, 44, kv. 76; Boris A. Smirnov, ulitsa Borisa Galushkina, 17, kv. 26; Ivan A. Korolkov, ulitsa Polyarnaya, 52, korpus 2, kv. 174; Viktor P. Bashilov, ulitsa Akademika Pavlova, 27, korpus 2, kv. 87, and Tatyana L. Ivanova, ulitsa Polyarnaya, 52, korpus 3, kv. 408, all of Moscow, U.S.S.R.

Filed Jul. 21, 1983, Ser. No. 515,979
Int. Cl.[4] A61B *17/10, 17/32*
U.S. Cl. 128—305 **6 Claims**

1. A surgical instrument for resection of hollow organs, comprising a suturing device for suturing with staples including a supporting body having depressions for bending said staples, a staple body having a staple magazine for accommodating said staples, and an ejector for ejecting said staples from said magazine; a pivot device for coupling said staple body and said supporting body together for relative movement for placing an organ therebetween and for suturing it in a predetermined area, the pivot device being arranged at one end of said suturing device, a retainer for locking a relative position of the bodies arranged adjacent an opposite end of the suturing device; a cutting device; and means for moving said supporting body with respect to said staple body to vary the spacing between said bodies adjacent both ends of said suturing device and thereby ensure substantial parallelism of said bodies in a



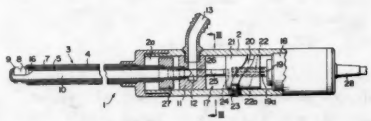
closed position; and said moving means including a mechanism for moving the pivot device, said pivot device moving mechanism being coupled to said supporting body for moving the supporting body and comprising two plates arranged on opposite sides of the staple body and installed for parallel movement with respect to the longitudinal centerline of the suturing device, each plate having a pair of inclined grooves adjacent the opposite ends thereof, with a pivot pin of the pivot device being installed in one pair of inclined grooves, and the retainer comprising a fork member having pins which are received in the other pair of inclined grooves.

4,589,414

SURGICAL CUTTING INSTRUMENT

Yutaka Yoshida; Shozo Hirayama, both of Hachioji; Hiroyuki Kusunoki, Higashimurayama; Yoshio Shishido, Sagamihara; Kazumasa Matsuo, Tama; Morihide Mizumoto, Hachioji; Masahiko Kato, Akikawa, and Tadao Hagino, Yokohama, all of Japan, assignors to Olympus Optical Co., Ltd., Japan

Filed Apr. 20, 1984, Ser. No. 602,607
Claims priority, application Japan, Apr. 27, 1983, 58-74762
Int. Cl.[4] A61F *17/32;* A61B *17/20*
U.S. Cl. 128—305 **10 Claims**



1. A surgical cutting instrument comprising:
an outer sheath tube having an open distal end and a proximal end secured to a grip of the instrument;
an inner stationary tube having a closed distal end which tube is disposed within said outer sheath tube in such a manner that the distal end of said inner tube projects from said open distal end of said outer sheath tube and its proximal end is secured to said grip;
a cutting opening provided on the peripheral wall of said projected distal end of the inner tube so as to define a cutting edge on the edge of said cutting opening for drawing cut tissue chips;
a sliding member which is slidably provided between said

outer sheath tube and said inner tube so that the distal end of said sliding member can open and close said cutting opening, said sliding member having an outer cutting edge which engages said inner cutting edge of said cutting opening on the distal end of said sliding member;

drive means for axially and slidingly reciprocating said sliding member so as to open and close said cutting opening; and

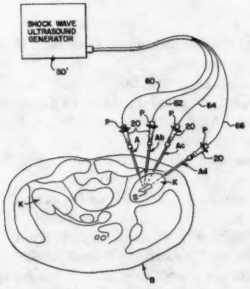
suction and discharge means connected to said inner tube so as to communicate therewith for effecting the suction operation through a suction channel formed in said inner tube.

4,589,415

METHOD AND SYSTEM FOR FRAGMENTING KIDNEY STONES

John R. Haaga, 3409 N. Hilltop, Chagrin Falls, Ohio 44022

Filed Aug. 31, 1984, Ser. No. 645,831
Int. Cl.[4] A61B *17/00*
U.S. Cl. 128—328 **5 Claims**



1. A method of fragmenting a stone lodged in a discrete organ of a human body, said method comprising the steps of:

(a) providing a plurality of elongated tubular sheaths, each formed from a thin walled material with a high acoustical impedance and having an inner passage extending in a given direction from an inlet first end to an outlet second end;

(b) forcing said sheaths into said body by a trocar extending through said passage and from said outlet second end to positions of said sheaths wherein said outlet second end of said sheaths is near to, but spaced from, said organ and said given direction of the passage in each of said sheaths points generally toward said stone;

(c) removing said trocar;

(d) inserting an elongated energy transmitting probe into each of said body mounted sheaths for directing acoustical energy through the passages and toward said stone when said transmitting probes are each energized by an acoustical power source; and,

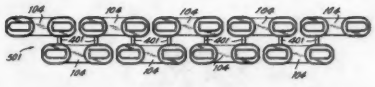
(e) energizing each of said transmitting probes individually with an acoustical power source with the summation of acoustical energy from said sheaths and at said stone being sufficient to fragment said stone while the acoustical energy from any one of said sheaths being generally insufficient to fragment said stone.

4,589,416

SURGICAL FASTENER RETAINER MEMBER ASSEMBLY

David T. Green, Norwalk, Conn., assignor to United States Surgical Corporation, Norwalk, Conn.

Continuation of Ser. No. 538,988, Oct. 4, 1983, abandoned. This application Apr. 11, 1985, Ser. No. 722,198
Int. Cl.[4] A61B *17/04*
U.S. Cl. 128—334 C **20 Claims**



1. A unitary assembly of surgical fastener retainer members, for interengagement with a plurality of surgical fastener members for application to body tissue, said assembly comprising:

a plurality of surgical fastener retainer members arranged in a surgically useful configuration, each of said retainer members having at least two spaced apertures; and

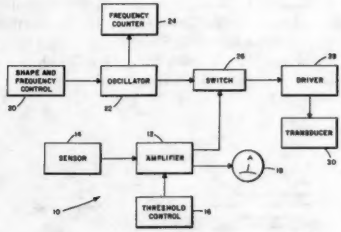
one or more yieldable links disposed between the retainer members, each of said links having a cross-sectional area substantially less than the cross-sectional area of each retainer member intermediate the apertures in that retainer member, each of said retainer members being connected by at least one such link to at least one other retainer member so that all the retainer members are connected to each other for interengagement with said plurality of surgical fastener members as a unitary assembly.

4,589,417

APPARATUS FOR SELECTIVE MEASURING AND TREATING DISORDERED TISSUES

Ali H. Eseifan, 90 Randolph Ave., South San Francisco, Calif. 94080, and Laurence E. Badgley, 370 San Bruno Ave. West, San Bruno, Calif. 94066

Filed Sep. 10, 1984, Ser. No. 648,818
Int. Cl.[4] A61N *1/32*
U.S. Cl. 128—422 **14 Claims**



13. Apparatus for treatment of afflicted area of a body comprising, in combination:

shape and frequency control means;

oscillator means electrically connected to said shape and frequency control means;

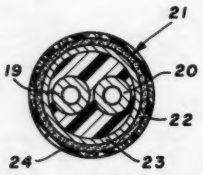
frequency counter means electrically connected to said oscillator means; and transducer means electrically connected to electronic driver means and provided with means for releasably attaching to said afflicted area.

4,589,418

COATING FOR SILVER/SILVER CHLORIDE REFERENCE ELECTRODE

Mysore L. Gopikanth, Burlington, Mass., assignor to Cardiac Pacemakers, Inc., St. Paul, Minn.

Continuation of Ser. No. 447,436, Dec. 6, 1982, abandoned. This application Aug. 17, 1984, Ser. No. 642,056
Int. Cl.[4] A61B 5/00
U.S. Cl. 128—635 3 Claims



1. In combination; a pulse generator for a pacer adapted to periodically stimulate the heart tissue of a host and wherein the pulse generator comprises a power source with circuitry being coupled to the power source for generating periodic heart stimulation signals and with leads being coupled to the circuitry for delivering stimulation signals to the heart tissue, and a condition responsive electrical signal generating electrode adapted to be in direct contact with the blood of the host and responsive to the pH level of the blood of the host, and with said signal generating electrode being coupled to a signal pick-up means within the pulse generator portion of the combination, said combination being characterized in that:

(a) the signal generating electrode is a silver/silver chloride reference electrode having a condition responsive and active outer surface, a blood contacting film coating extending over said active outer surface and in direct surface-to-surface contact therewith; and

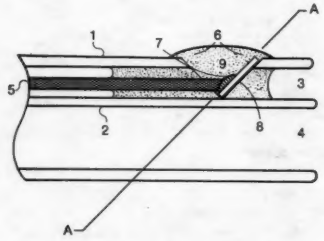
(b) the film coating having a thickness of about 5 mils and being a silicone polymer containing potassium chloride solids dispersed within the silicone polymer film, said silicone polymer containing between about 20 and 40 milligrams of potassium chloride per gram of silicone polymer solids.

4,589,419

CATHETER FOR TREATING ARTERIAL OCCLUSION

Donald E. Laughlin, West Branch; Robert F. Wilson, and Thomas A. Drews, both of Iowa City, all of Iowa, assignors to University of Iowa Research Foundation, Iowa City, Iowa

Filed Nov. 1, 1984, Ser. No. 667,130
Int. Cl.[4] A61B 10/00
U.S. Cl. 128—663 4 Claims



1. In the method for treating blockage of a coronary artery in which a catheter is threaded up to the site of the blockage by following a radio-opaque guide wire in the catheter flouroscopically, the improvement comprising the steps of

determining the rate at which blood is flowing in the artery by means of a single-crystal Doppler transducer embedded in the side of the catheter near its distal end,

administrating a vasodilator, and

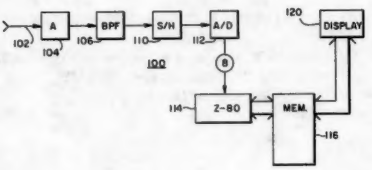
determining from the subsequent change in blood flow velocity measured by the Doppler transducer whether the artery downstream of the transducer is patent.

4,589,420

METHOD AND APPARATUS FOR ECG RHYTHM ANALYSIS

Isabelle M. Adams, Woodland Hills; James M. Carlson, Chatsworth; James B. Rooks, Canyon Country, and Amalia Yeshaya, Los Angeles, all of Calif., assignors to Spacelabs Inc., Chatsworth, Calif.

Filed Jul. 13, 1984, Ser. No. 630,782
Int. Cl.[4] A61B 5/04
U.S. Cl. 128—702 16 Claims



1. An apparatus for automatic heartbeat rhythm analysis of ECG signals comprising:

means for digitizing said ECG signals;

means responsive to said digitized ECG signals for automatically detecting heartbeats including means for analyzing said detected heartbeats;

means for assessing the relative timing of said detected heartbeats relative to prior heartbeats;

means responsive to said analysis for classifying each of said detected heartbeats as one of a plurality of beat types, said plurality of beat types including a plurality of sequences of beat types, said classifying means further comprising:

first stage means responsive to said timing means for automatically classifying each of said detected heartbeats as one of a first plurality of single heartbeat types; and

state machine means responsive to said first stage classification for automatically determining when said detected heartbeats are part of one of said plurality of sequences of heartbeat types and for classifying said detected heartbeats so determined as belonging to one of said sequence type plurality, said apparatus further comprising:

means responsive to said classifying means for automatically forming and storing class records, at least one for each of said plurality of beat types including said plurality of sequences of beat types; and

means for displaying all or a portion of preselected ones of said class records.

4,589,421

SAMPLING DEVICE

Edwin F. Ullman, Atherton, Calif., assignor to Syntex (U.S.A.) Inc., Palo Alto, Calif.

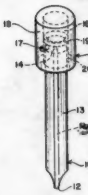
Filed Mar. 14, 1984, Ser. No. 589,430
Int. Cl.[4] A61B 5/14
U.S. Cl. 128—763 21 Claims

1. A sampling device, which comprises—

a capillary tube having a first orifice for collecting by capillarity a predetermined amount of a liquid and dispensing said predetermined amount of liquid and a second orifice at its other end,

means defining a chamber enclosing said second orifice,

an means defining an opening to the outside atmosphere, other than said first orifice, communicating with said capillary tube, and



substantially rigid means movable with respect to said means defining an opening for concomitantly sealing said opening and forcing air from said chamber through said capillary tube thereby dispensing said predetermined amount of liquid.

4,589,422

ELECTROMAGNETIC MEDICAL APPLICATORS

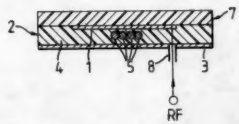
James R. James, Swindon, and Reginald H. Johnson, Malvern, both of England, assignors to National Research Development Corporation, London, England

Filed Feb. 3, 1984, Ser. No. 576,708

Claims priority, application United Kingdom, Feb. 4, 1983, 8303179; Apr. 11, 1983, 8309776

Int. Cl.⁴ A61N *5/00*

U.S. Cl. 128—804 **14 Claims**



1. An electromagnetic medical applicator comprising:

a laminar resonator, a conducting ground plane, a layer of an electromagnetic medium separating said resonator from said ground plane, and electrical connection means to said resonator and ground plane, said electromagnetic medium comprising separate volumes of magnetic material and of dielectric material with magnetic material located substantially only adjacent that region of the resonator where in use the resonator current is a maximum and said resonator being in intimate contact with said dielectric material adjacent that region of the resonator where in use the resonator current is a minimum, said magnetic material providing an improved path for the magnetic field associated with said current;

and a layer comprising at least dielectric material overlying said resonator.

4,589,423

APPARATUS FOR CREATING HYPERTHERMIA IN TISSUE

Paul F. Turner, North Salt Lake, Utah, assignor to BSD Medical Corporation, Salt Lake City, Utah

Division of Ser. No. 405,947, Aug. 6, 1982, which is a continuation-in-part of Ser. No. 136,506, Apr. 2, 1980, Pat. No. 4,462,412. This application Aug. 6, 1984, Ser. No. 637,840

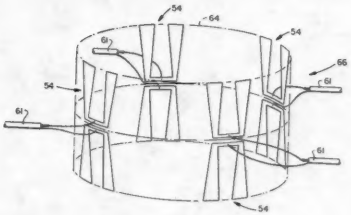
Int. Cl.⁴ A61N *5/00*

U.S. Cl. 128—804 **4 Claims**

1. An apparatus for irradiating a target having a central axis and a diameter, with electromagnetic radiation, comprising:

a plurality of individual applicators, wherein each of said applicators is a dipole antenna;

means for coupling said applicators together to form an annular array forming an interior for locating the target therein and said applicators positioned to emit radiation toward the central axis having the radiation electric field component aligned parallel with the central axis;



a bolus located within said interior and adaptable for positioning between the applicators and the target; and

means for coupling electromagnetic radiation to said applicators and for providing radiation having a predetermined phase relationship.

4,589,424

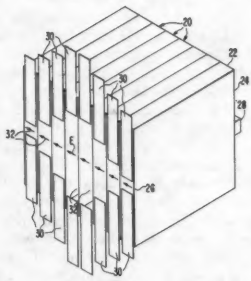
MICROWAVE HYPERTHERMIA APPLICATOR WITH VARIABLE RADIATION PATTERN

Victor A. Vaguine, Dallas, Tex., assignor to Varian Associates, Inc, Palo Alto, Calif.

Filed Aug. 22, 1983, Ser. No. 525,182

Int. Cl.⁴ A61N *5/02*

U.S. Cl. 128—804 **4 Claims**



1. An applicator for hyperthermia treatment of tissue by irradiation with microwave energy comprising:

a plurality of side-by-side rectangular waveguides each having an open end forming a radiation aperture, whereby apertures of said plurality of waveguides provide a composite radiation aperture;

variable shutter means associated with each of said radiation apertues for individually varying said radiation apertures and forming a desired shape for said composite aperture, said shutter means comprising two shutter elements associated with each of said apertures and slidable across each said aperture, the two shutters for individual ones of said apertures being moveable toward and away from each other, the shutters for adjacent ones of said apertures being moveable along paths which are parallel one to the other; and

means for coupling each of said waveguides to a microwave power source,

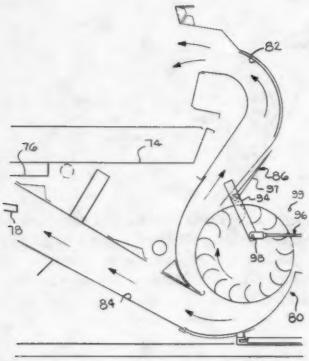
whereby said shutter means can be adjusted to provide a radiation pattern adapted for efficient hyperthermia treatment of tissue having a prescribed size, shape and location.

4,589,425

CONTROL APPARATUS FOR A COMBINE

Thomas A. Mitchell, Jr., Rte. #2, Liberty Center, Ohio 43532

Filed Jul. 2, 1984, Ser. No. 627,335
Int. Cl.[4] A01F *12/00*
U.S. Cl. 130—27 HF 11 Claims



1. A combine apparatus for harvesting a crop material from a field comprising:

engine means for driving the combine;

harvesting means for removing a quantity of such crop material from such field;

cleaning means for separating grain material and trash material from such crop material, said cleaning means acting to deliver a predetermined volume of air to such grain material and said trash material, said cleaning means acting to expel such trash material from said combine apparatus;

said cleaning means including a fan means for delivering such volume of air to such grain material, a baffle plate being pivotally mounted and adjacent said fan means, and a mechanical linkage means for moving said baffle plate between the open and closed positions;

regulating means for controlling the supply of air delivered to such grain material and such trash material, said regulating means including an activating means, said activating means being pivotally mounted and positioned adjacent said fan baffle plate, said activating means pivoting said plate toward an open position relative to said fan means, and a return means for urging said fan choke means toward a closed position; said regulating means, when moved toward the open position acting to allow a greater volume of air to be delivered to such grain material, said regulating means upon moving toward the closed position reducing the volume of air delivered to such grain material, said regulating means acts to move between the open and closed positions in accordance with the load on said engine means.

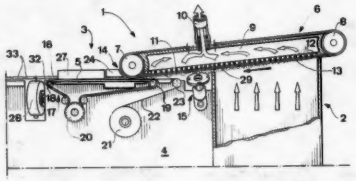
4,589,426

CONTINUOUS-ROD CIGARETTE MANUFACTURING MACHINE

Riccardo Mattei, Bologna, Italy, assignor to G.D. Società per Azioni, Bologna, Italy

Filed Aug. 17, 1984, Ser. No. 641,848
Claims priority, application Italy, Sep. 12, 1983, 3555 A/83
Int. Cl.[4] A24C *5/18, 5/28*
U.S. Cl. 131—84.3 2 Claims

1. A continuous-rod cigarette manufacturing machine (1) comprising a first suction conveyor belt (6) for forming and transferring a continuous stream (29) of tobacco; a shaving device (15) for reducing the stream (29) into sections (30, 31) of different thicknesses alternating at regular intervals; a second, air-permeable conveyor belt (17) running over a shelf (5) on the said machine (1) and supporting a strip (22) of cigarette paper fed with the said tobacco stream, at a point (14) known as a loading point, by the first conveyor belt (6); means (27) for wrapping the paper strip (22) around the tobacco stream (29) for forming a continuous cigarette rod (32); a rotary cutter (28)



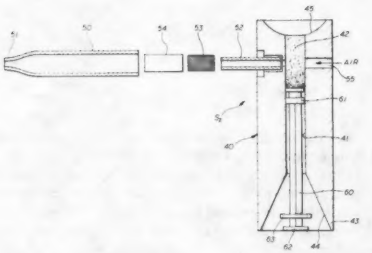
operating in strict time with the shaving device (15); a fixed pressing element (24) located over the loading point (14) and acting on the tobacco stream (29); and at the loading point (14), air-powered suction means (26) acting on the said tobacco stream (29), so as to counteract braking action exerted by the pressing element (24).

4,589,427

SMOKING APPARATUS

Frank E. Barnes, 8557 Capitol of Texas Highway, Apt. 1115, Austin, Tex. 78946

Filed Dec. 13, 1984, Ser. No. 681,363
Int. Cl.[4] A24F *1/26, 3/02*
U.S. Cl. 131—181 4 Claims



1. Smoking apparatus comprising:

a tubular chimney having a cylindrical interior open at both ends and in which a charge of smoking material may be placed;

conduit means in fluid communication with said chimney and through which smoke from the burning of said smoking material may be drawn by the mouth of a smoker;

an air inlet in fluid communication with said conduit means and through which air may be drawn for entrainment of said smoke therewith from said chimney; and

plunger means engaging said cylindrical interior of said chimney and reciprocally movable relative thereto for displacing burned smoking material from said chimney;

said tubular chimney being fixed relative to said conduit means, said plunger means being insertable into said chimney interior from the end of said chimney opposite the end at which said smoking material is burned for loading of said smoking material charge in said cylindrical interior and for said displacement of burned material therefrom; and

the end of said tubular chimney, opposite the end in which said smoking material is burned, being flared to provide a funnel area adjacent said cylindrical interior and by which smoking material may be more easily loaded into said tubular chimney.

4,589,428

TOBACCO TREATMENT

Gus D. Keritsis, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Filed Feb. 21, 1980, Ser. No. 123,247
Int. Cl.[4] A24B *15/24, 15/30*
U.S. Cl. 131—297 9 Claims

1. In the preparation of a smoking tobacco product including the steps of forming an aqueous extract of tobacco, separating the aqueous extract from the fibrous tobacco residue, the improved method of treating the tobacco to obtain a product which exhibits reduced delivery of gas phase components during combustion thereof, which methhod comprises subjecting tobacco to the following treatments:

(a) measuring the potassium content of the aqueous extract;

(b) treating the aqueous extract to remove potassium nitrate therefrom;

(c) remeasuring the potassium content of the denitrated extract obtained in step (b) and thereafter adding a potassium salt other than potassium nitrate to the denitrated extract to achieve a potassium content approximating that originally present in the unextracted tobacco; and

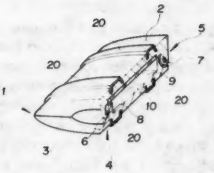
(d) recombining the denitrated potassium containing extract and the fibrous tobacco residue.

4,589,429

VANITY CASE

Yoshiharu Hatakeyama, Tokyo, and Kenzo Teshima, Chiba, both of Japan, assignors to Yoshida Industry Co., Ltd., Tokyo, Japan

Filed Nov. 2, 1984, Ser. No. 668,554
Claims priority, application Japan, Nov. 7, 1983, 58-171338[U]
Int. Cl.[4] A45D *33/00*
U.S. Cl. 132—79 R 6 Claims



1. A vanity case comprising:

a cover;

a receptacle openably hinged to said cover, said cover and said receptacle together forming a container body formed of molded synthetic resin material; and

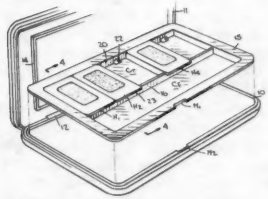
at least one ornamental metallic band provided on the outer surface of said container body, said band having a generally U-shaped cross section defined by a main portion and a pair of side portions extending downwardly from opposite longitudinal edges of said main portion, said band being integrally attached to said container body by partly embedding said side portions in the synthetic resin material forming said container body when said container body is molded, and said main portion being exposed and projecting outwardly from said outer surface of said container body by the remaining of said side portions.

4,589,430

COSMETIC KIT WITH REPLACEABLE HOLDERS

Morris Sussman, Freeport, N.Y., assignor to Shore Plastics, Inc., Freeport, N.Y.

Filed Apr. 2, 1984, Ser. No. 595,685
Int. Cl.[4] A45D *33/00*
U.S. Cl. 132—82 D 6 Claims



1. A make up kit for storing an assortment of different cosmetics and applicators therefor, said kit comprising:

A. a rectangular case having a hinged cover;

B. a tray nested in the case and divided by a longitudinal ridge into a front compartment for accommodating the applicators and a rear compartment for receiving a row of replaceable miniature holders, each carrying a supply of a different cosmetic;

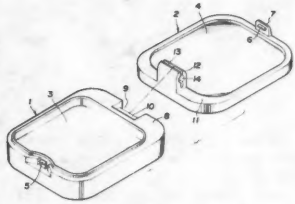
C. each of said holders having a base, a front end and a rear end, and being dimensioned to snap into the rear compartment and to fit snugly between the ridge and the rear wall of the tray, the holder having a tongue formed on its rear end which projects from the base thereof and is socketed within a complementary slot in the rear wall of the tray, the top of the holder being provided with a forwardly projecting ledge which overlies the ridge and acts as a thumb piece to facilitate withdrawal of the holder from its compartment, and a detent on the front end below said ledge to engage the side of the ridge to retain the holder in the rear compartment.

4,589,431

VANITY CASE

Yukitomo Yuhara, Abiko, Japan, assignor to Yoshida Industry Co., Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 356,147, Mar. 8, 1982, abandoned. This application Mar. 13, 1984, Ser. No. 589,669
Claims priority, application Japan, Aug. 24, 1981, 56-124122[U]
Int. Cl.[4] A45D *33/00*
U.S. Cl. 132—83 R 5 Claims



1. A vanity case comprising:

a receptacle member molded of plastic material and adapted to contain cosmetic material, said receptacle member having a front portion having a first latch tongue, a rear portion, and an upper surface;

a cover member molded of plastic material and having a

front portion having a second latch tongue, a rear portion, and a lower surface; and

means for hingedly connecting said rear portion of said cover member to said rear portion of said receptacle member such that said cover member is pivotable over said receptacle member between a closed position whereat said lower surface is over said upper surface and said first and second latch tongues are in snap engagement, and an open position whereat said lower surface is spaced from said upper surface and said first and second latch tongues are out of engagement, said connecting means comprising:

a recess formed in a substantially central area of one of said rear portion of said receptacle member and said rear portion of said cover member, said recess being partially defined by a pair of spaced side walls;

a horizontal pin integrally provided at said central area and extending between said walls of said recess;

a hinge block provided at a substantially central area of the other of said rear portion of said receptacle member and said rear portion of said cover member;

a groove formed in said hinge block and extending vertically when said cover member is in said closed position, said groove having an upper groove half and a lower groove half, and said groove including a horizontally extending enlarged section between said upper groove half and said lower groove half, said enlarged section having a diameter slightly smaller than a diameter of said horizontal pin;

said horizontal pin being forcedly inserted into said groove and snugly fitted in said enlarged section thereof when said hinge block is positioned within said recess, thereby hingedly connecting together said cover member and said receptacle member with a frictional resistance generated between said horizontal pin and said enlarged section, said frictional resistance being sufficient to maintain said cover member at any desired opening angle with respect to said receptacle member, and said frictional resistance being maintained semi-permanently by the elasticity provided by said upper and lower groove halves; and

said upper and lower groove halves enabling elastic expansion of said hinge block while retaining said pin in said enlarged section, such that said cover member is capable of sufficient movement with respect to said receptacle member to avoid overly tight engagement between said first and second latch tongue due to dimensional inaccuracies therebetween.

4,589,432

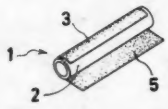
EYELASH PERMANENT CURL SETTING ROD

Mikio Honda, Fuji-Yoshida, Japan, assignor to Royal Biken Company, Ltd., Tokyo, Japan

Filed May 23, 1984, Ser. No. 613,321

Int. Cl.[4] A45D *40/26*

U.S. Cl. 132—88.7 **20 Claims**



1. An eyelash permanent curl setting rod, in connection with which permanent hair setting solution is to be used, comprising:

a single rod member having a diametrical extent sufficiently small so as to permit human eyelashes to be wrapped about said single rod member in a circumferential manner; and

adhesive means disposed upon the outer periphery of said single rod member for permitting said eyelashes to adhere to said single rod member and for permitting said single rod member to adhere to the human eyelid when said eyelashes are circumferentially wrapped about said single rod member so as to curl said eyelashes in conjunction with said permanent hair setting solution.

4,589,433

COIN DISPENSING APPARATUS

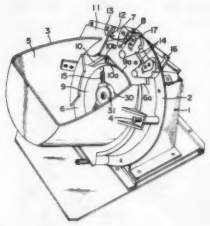
Hiroshi Abe, Tokyo, Japan, assignor to Asahi Seiko Kabushiki Kaisha, Japan

Filed Nov. 28, 1984, Ser. No. 675,656

Claims priority, application Japan, Dec. 7, 1983, 58-188107[U]; Dec. 7, 1983, 58-188106[U]; Dec. 7, 1983, 58-188105[U]; Feb. 13, 1984, 59-22825

Int. Cl.[4] G07D *9/00*

U.S. Cl. 133—5 R **4 Claims**



1. A coin dispensing apparatus, comprising:

a supporting plate inclined to the horizontal, a hopper mounted on the supporting plate for holding a supply of coins, a rotary disc rotatably supported on the supporting plate within the hopper, the rotary disc having at the central portion thereof a central disc of a diameter depending on a diameter of a coin to be dispensed and having at the peripheral portion a plurality of coin engaging projections spaced in the peripheral direction;

bearing means including a plurality of balls interposed between the supporting plate and the outer peripheral portion of the rotary disc and spaced apart from each other in the peripheral direction for rotatably supporting the rotary disc on the supporting plate, a drive shaft extending through the supporting plate and the rotary disc for rotating said rotary disc, a delivery knife secured to the supporting plate with a knife point thereof being tangential to the upper periphery of the central disc, a delivery chute adapted for receiving the coins from the rotary disc by the delivery knife;

antidoubling means for controlling passing of the coins at the upper delivery zone;

agitating means on the central disc for agitating coins within the hopper, the agitating means including a plurality of coil springs arranged so as to extend radially of the drive shaft on the central disc, an elastomer retainer for resiliently retaining the inner end portions of the coil springs; and

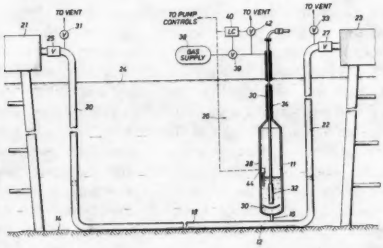
connecting means secured to the drive shaft for connecting the elastomer retainer in a compressed state to the rotary disc and for urging resiliently the rotary disc towards the supporting plate, said connecting means having a plurality of connecting legs spaced in the circumferential direction, wherein said elastomer retainer, said coil springs, said central disc are integrally connected to said rotary disc with said connecting legs.

4,589,434

METHOD AND APPARATUS TO PREVENT HYDRATE FORMATION IN FULL WELLSTREAM PIPELINES

Bruce T. Kelley, Houston, Tex., assignor to Exxon Production Research Co., Houston, Tex.

Filed Jun. 10, 1985, Ser. No. 743,173
Int. Cl.[4] F17D 1/14
U.S. Cl. 137—1 43 Claims



29. A method for preventing hydrate formation in a pipeline system for transporting produced fluids from a source thereof, the pipeline system including at least one riser, comprising the steps of:

shutting down flow through the pipeline system;

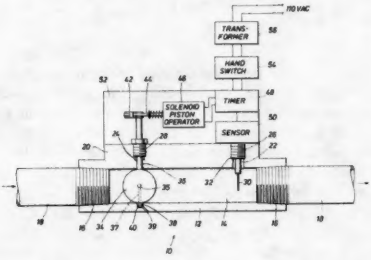
removing produced fluids from the pipeline system in an amount sufficient to reduce the level of liquid produced fluids in the riser below the level at which hydrates will form in the produced fluids following shutdown of the pipeline system.

4,589,435

WATER SHUTOFF VALVE

Donald C. Aldrich, P.O. Box 91, Sweeney, Tex. 77480

Filed Sep. 24, 1984, Ser. No. 653,709
Int. Cl.[4] F16K 21/16
U.S. Cl. 137—102 8 Claims



1. A shutoff valve for shutting off a fluid line in response to fluid flow through the line for a selected time intervals, said shutoff valve comprising:

(a) a valve body open at each end and having an axial passage extending therethrough;

(b) a normally open valve disk mounted in said axial passage to prevent fluid flow through the fluid line on closing of said valve disk;

(c) valve actuator means for closing said valve disk in response to fluid flow through the fluid line;

(d) a valve stem extending from said valve disk through said valve body and operatively connected to said actuator means, said valve stem further including an end pivotally received in a mating aperture formed in said valve body;

(e) a drain outlet passage in said valve body for registry with another drain passage extending partially through said valve disk permitting fluid to drain from said fluid line upon closure of said valve disk;

(f) sensing means supported by said valve body for sensing fluid flow through said axial passage, said sensing means producing an electrical signal indicative of the fluid flow;

(g) timer means connected with said valve actuator means and said sensing means, said timer means being settable in a selected time interval for energizing said actuator means to close said valve disk on receipt of an encoded electrical signal from said sensing means indicating continuous fluid flow through said valve for the selected time interval; and

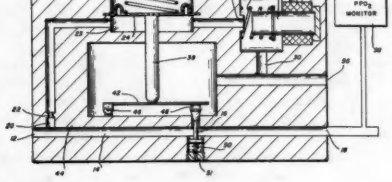
(h) switch means connecting said valve via transformer means to a power source to provide electrical power.

4,589,436

OXYGEN PARTIAL PRESSURE CONTROLLER FOR A PRESSURE SWING ADSORPTION SYSTEM

Bernard J. Schebler, Davenport, and Russell F. Hart, Blue Grass, both of Iowa, assignors to Litton Systems, Inc., Davenport, Iowa

Filed Mar. 10, 1983, Ser. No. 474,131
Int. Cl.[4] G05D 21/02
U.S. Cl. 137—115 2 Claims



1. An oxygen partial pressure controller for regulating the oxygen partial pressure (PPO_2) of the product gas of a pressure swing adsorption oxygen enriching system which is operating at a system pressure applied to the inlet of the controller, in which the PPO_2 of the product gas is inversely proportional to the flow of product gas through the system, said controller utilizing a conventional PPO_2 monitor and signal conditioning elements, said controller comprising:

a bleed valve for increasing product gas flow through the controller by increasing the bleed flow of product gas,

a diaphragm enclosing a chamber and responsive to chamber pressure,

a line coupling said chamber to said product gas at system pressure, and an outlet venting said chamber to atmospheric pressure,

linkage means coupled to said diaphragm for controlling the operation of said bleed valve, and

a solenoid valve responsive to said PPO_2 monitor and said signal conditioning means for controlling chamber pressure, wherein said solenoid valve is operable to block said outlet thereby increasing the chamber pressure to equal system pressure, and wherein said solenoid valve is operable to open said outlet thereby decreasing the chamber pressure to equal atmospheric pressure,

wherein high chamber pressure causes said bleed valve to open increasing gas flow and lowering PPO_2, and low chamber pressure causes said bleed valve to close decreasing gas flow and increasing PPO_2.

4,589,437

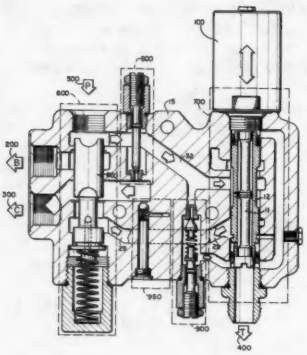
REEL SPEED VALVE ASSEMBLY

Kenneth W. Zeuner, 43 Red Fox Dr., New Hope, Pa. 18938; Steven K. Zeuner, 39 Larch Cir., and Thomas A. Zeuner, 230 Woodlake Dr., both of Holland, Pa. 18966

Continuation-in-part of Ser. No. 511,576, Jul. 7, 1983, abandoned. This application Jan. 6, 1984, Ser. No. 568,582

Int. Cl.[4] F15B *13/043*

U.S. Cl. 137—117 8 Claims



1. A valve assembly for speed control comprising a proportional control valve and a compensator valve, and having an inlet port, an outlet port, a tank port and a bypass port;

said compensator having a spool with upper and lower metering edges disposed in upper and lower compensator chambers, respectively;

said proportional control valve having control inlet, and control outlet ports; said proportional control valve has a valve open and a valve closed position, means for fluidly coupling the tank port to the control outlet port when the proportional control valve is in the valve closed position;

said upper compensator chamber being in direct fluid communication with the assembly inlet port, the control inlet port, and the bypass port, said upper metering edge movably disposed within said upper compensator chamber to meter fluid flow between said assembly inlet port and said bypass port. said assembly inlet port being in close physical proximity with said bypass port and in direct fluid communication therewith free of any valving restrictions other than said upper metering edge;

said lower compensator chamber being in direct fluid communication with the control outlet port and with the assembly outlet port, said lower metering edge movably disposed within said lower compensator chamber to meter fluid flow between said control outlet port and said assembly outlet port whereby the position of said compensator spool changes in response to the difference of fluid pressures between said upper and lower compensator chambers thereby providing a constant feedback loop from said assembly outlet port to said assembly inlet port maintaining a substantially constant pressure drop across the valve assembly.

4,589,438

DIVERTER VALVE WITH INTEGRAL ATMOSPHERIC TYPE VACUUM BREAKER

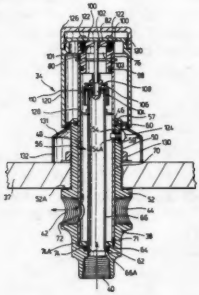
Silvano Breda, 81 Apricot Street, Thornhill, Ontario, Canada

Continuation of Ser. No. 466,062, Feb. 14, 1983, abandoned. This application Jan. 24, 1985, Ser. No. 694,752

Int. Cl.[4] F16K *24/02*

U.S. Cl. 137—218 3 Claims

1. A diverter valve with integral atmospheric type vacuum breaker for connection to a faucet or other valve which faucet or other valve controls water flow to the diverter valve, the diverter valve comprising a main housing or body, having an integral central chamber portion defined by an internal wall and, vertically directed openings at opposed ends of the housing or body through the housing or body into the central chamber portion, a plurality of laterally directed openings extending from the outer surfaces of the body through the internal wall of the body opening into the chamber, at least one opening for directing water for one type of use and at least one opening for directing water for another type of use, an inlet tube in communication with the lowermost of the vertically directed openings and extending a predetermined distance from the lowermost vertically directed opening to an open end, said lowermost vertically directed opening in communication with the faucet or the other valve controlling the water flow to the diverter valve, a rotatable cylindrical tube between the internal wall defining the chamber and the outer surface of the inlet tube for permitting communication between selected of such laterally directed openings and the open end of the inlet tube at a time, the cylindrical tube comprising a plurality of sets of spaced openings spaced by a predetermined distance, one set of at least one opening for alignment with at least one opening for directing water for one use and another set of at least one opening for alignment with the at least one opening directing water for another use whereby when one set of at least one opening is fully aligned with the at least one opening,

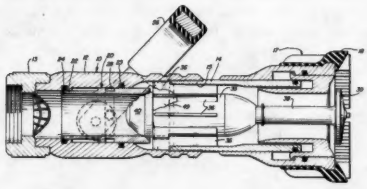


the other set of at least one opening is not in communication with the other at least one opening and whereby when the cylindrical tube is rotated to align a set of at least one opening with at least one opening for directing water for one or the other type of use, water entering the inlet tube from the lowermost vertically directed opening of the main body or housing continues to flow passing out of at least one of the openings in the body for directing water for one or the other type of use, a float disc assembly reciprocal from a position spaced from the open end of the inlet tube closing the upper end of the diverter valve to the atmosphere, to a position closing the inlet tube opening the upper end of the diverter valve to atmosphere, the float disc assembly comprising a resilient seat having a diameter less than the inner diameter of the rotatable cylindrical tube and at least the outer diameter of the inlet tube and carrying a downwardly depending skirt at the perimeter thereof whereby when the fluid is fed through the inlet tube into the valve, the assembly is moved away from the end of the inlet tube closing the valve to atmosphere to permit the fluid to pass out the open end of the inlet tube into the valve, and when fluid is not passed through the inlet tube, the assembly closes the open end of the inlet tube with the skirt surrounding the upper end of the inlet tube and permits venting of the valve to atmosphere, means permitting rotation of the rotatable cylindrical tube a predetermined distance and means for mounting the diverter valve.

4,589,439
FIRE APPARATUS VALVE

Robert W. Steingass, Valparaiso, Ind., assignor to Task Force Tips Incorporated, Valparaiso, Ind.

Filed Aug. 27, 1984, Ser. No. 644,260
Int. Cl.[4] F16K *3/26, 31/52*
U.S. Cl. 137—219 11 Claims



1. In a flow-control valve assembly comprising a valve body, an axially slidable tubular valve member disposed axially within said valve body and having a bevelled surface at the downstream end thereof, a valve seat member restrained against axial movement disposed in said valve body and in axial alignment with said tubular valve member, and means for effecting reciprocable movement of said tubular valve member into a position of sealing engagement with said valve seat and movement away from said sealing engagement to permit flow of fluid past said valve seat member, the improvement comprising: a valve seat having a contoured configuration defined by a surface of revolution about a central axis of a combination of linear and curved lines having different radii which provides a relatively blunt upstream end, a generally frustro-conical section extending downstream of said upstream end, a first spherical section forming a restricted flow passage downstream of said conical section, a second spherical section extending downstream of said first spherical section and having a radius of curvature greater than said first spherical section extending outwardly from said first spherical section and adapted to form a sealing engagement with said bevelled surface when said tubular valve member is moved axially into engagement therewith; whereby flow of fluid is increased proportional to the movement of the valve actuating means away from said sealing engagement while the differential pressure across the valve asembly is large and remains proportional to the movement of the valve actuating means further from said sealing engagement as the differential pressure across the valve decreases.

4,589,440
DEVICE FOR CONTROLLING THE FLOWRATE OF A FLUIDMORE PARTICULARLY A RADIOACTIVE FLUID

Michel Panet, Avon, France, assignor to Electricite de France (Service National), Paris, France

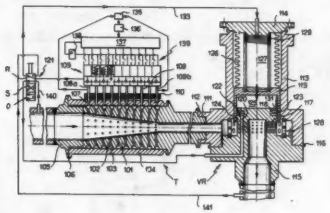
Filed Mar. 13, 1984, Ser. No. 588,951
Claims priority, application France, Mar. 22, 1983, 83 04654
Int. Cl.[4] G05D *7/03*
U.S. Cl. 137—486 13 Claims

1. A device for controlling the flowrate of a fluid, more particularly a radioactive fluid, comprising:

at least one nozzle (T) having a convergent section with static pressure take-off means at a variable point in the convergent section;

co-operating with the nozzle, a regulating valve (VR) having a movable closure member; means for varying the position of the closure member in dependence on the static pressure taken from the convergent section;

means for varying the static pressure take-off point in the convergent section in response to a condition of the fluid dependent upon its pressure, so that any variation in said condition around a set value causes modification of the position of the closure member, resulting in an opposing modification of the flowrate of the fluid, to return said condition to its set value, the closure member being as a

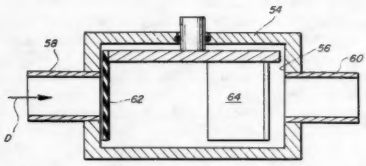


result operated by the use of the drop in pressure produced by the device.

4,589,441
SYSTEM FOR CONTROLLING LIQUID FLOW

Daniel N. Campau, 656 Duxbury Ct., Grand Rapids, Mich. 49506

Filed Jul. 10, 1984, Ser. No. 629,310
Int. Cl.[4] F16K *15/18*
U.S. Cl. 137—512 4 Claims



1. A system for controlling the flow of liquid between a reservoir and a liquid source, comprising:

conduit means between said reservoir and said source for the flow of liquid therebetween;

selectively operable valve means in said conduit means for actuation between a first position for filling the reservoir with liquid from said source and a second position for emptying liquid from the reservoir to said source;

automatic check valve means in said conduit means for preventing the flow of liquid from the reservoir to said source when said selectively operable valve means is in said first, filling position and for preventing the flow of liquid from said source to the reservoir when said selectively operable valve means is in said second, emptying position;

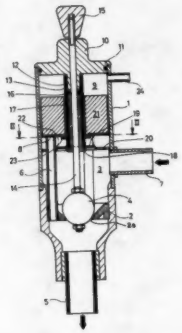
said conduit means comprising a passageway through a housing, and said selectively operable valve means and said automatic check valve means comprising a unitary structure in said housing for controlling both the flow of liquid through the housing in either direction and for checking the flow of liquid in the respective opposite direction; and

said housing having an inlet thereto from said source and an outlet therefrom to the reservoir, a first check valve member operatively associated with said inlet to permit the flow of liquid through the housing only from said source when said selectively operable valve means is in said first position, and a second check valve member operatively associated with said outlet to permit the flow of liquid through the housing only from said reservoir when said selectively operable valve means is in said second position.

4,589,442
VALVE FOR SUCTION INSTALLATION

Leif Ernryd, Urshult, Sweden, assignor to Sweden Recycling AB, Urshult, Sweden

Filed Oct. 9, 1984, Ser. No. 659,236
Claims priority, application Sweden, Oct. 10, 1983, 8305560
Int. Cl.[4] F16K *21/18*
U.S. Cl. 137—546 **12 Claims**



1. A valve for use with the suction line of apparatus for automatic draining of a liquid from a valve housing wherein the liquid may contain particles, the valve comprising:

a cylindrical enclosure including upper, middle, and lower chambers, and annular means for dividing said housing into said chambers,

first means for communicating the lower chamber with said suction line,

second means for communicating said middle chamber with a source of said liquid,

at least one tubular means each having one end communicating with said lower chamber and an opposite end communicating with said upper chamber,

float means supported in said upper chamber for movement in the axial direction of said enclosure, said float means being movable between one position in which said tubular means opposite end is blocked, and other positions in which said tubular means opposite end is blocked, and other positions in which said tubular means opposite end is unblocked, and

an annular membrane having a portion thereof fixed to said float means, said membrane normally covering said tubular means opposite end when said float means is in said one position,

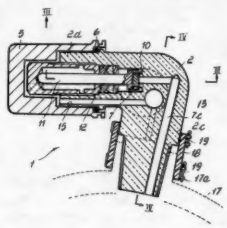
whereby suction in said suction line causes said liquid to enter said middle chamber, and when said liquid fills said middle chamber and rises above the annular means dividing said upper chamber from said middle chamber, the float means is raised from said one position whereupon said membrane uncovers at least a portion of said tubular means opposite end so that said liquid can flow into and through said tubular means to said suction line.

4,589,443
GAS BOTTLE VALVE INCORPORATING A GAS BLEED-OUT DEVICE, PARTICULARLY FOR USE ON GAS OPERATED MOTOR VEHICLE

Renzo Regazzi, Trebbo di Reno, Italy, assignor to O.M.V.L. s.r.l., Trebbo di Reno, Italy

Filed Jul. 5, 1984, Ser. No. 627,996
Claims priority, application Italy, Jul. 15, 1983, 4947/83[U]
Int. Cl.[4] F16K *24/00*
U.S. Cl. 137—588 **1 Claim**

1. A gas bottle valve incorporating a gas bleed-out device particularly for use on gas operated motor vehicles, comprising a body of substantially T-like configuration including a threaded section provided with an annular shoulder, for connection to a threaded fitting in the gas bottle, two cylindrical coaxial sections extending symmetrically from said threaded section, and a tubular portion transversally extending to the plane of said sections, a gas delivery conduit of substantially T-like configuration formed in said body and having branches extending along said sections, the branches extending along said coaxial sections having threaded ends for receiving gas delivery pipes, a valve shutter means arranged in said tubular portion and controlling said gas delivery conduit, wherein

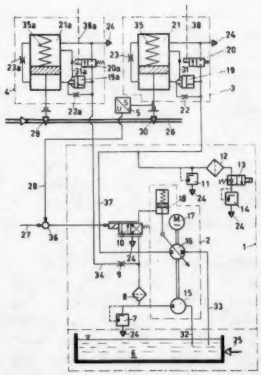


according to the improvement said shutter means include a socket-like knob tightly sealing said tubular portion, the valve further comprising a first bleed hole extending through said coaxial sections and open to the opposite ends thereof, a second bleed hole formed lengthwise in the tubular portions and connecting said first bleed hole with said socket-like knob, a cross bleed hole connected with said first bleed hole and opening at said annular shoulder, a sleeve tightly held on said threaded section of the body and on the threaded fitting in the gas bottle, and bleed pipes tightly associated onto said coaxial sections and in communication with the exterior of the vehicle.

4,589,444
ELECTRO-HYDRAULIC ACTUATOR FOR TURBINE VALVES

Jaroslav Masek, Wettingen, and Franz Suter, Gebenstorf, both of Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed May 16, 1984, Ser. No. 610,708
Claims priority, application Switzerland, May 30, 1983, 2955/83
Int. Cl.[4] F16K *11/20, 31/122;* F15B *13/06*
U.S. Cl. 137—613 **4 Claims**



1. An electro-hydraulic actuator system for turbine values

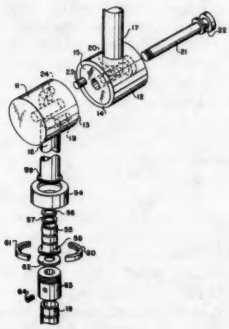
used in controlling steam flow in steam lines to a turbine, comprising a control valve and a rapid action stop valve for each of said lines to said turbine, said control valve and said rapid action stop valve having actuators of the same design, each actuator being integrated into a compact acuator unit positioned on its respective valve housing, a hydraulic supply, said actuators being connected in pairs to said hydraulic supply, said hydraulic supply located directly adjacent to said actuators and a volumetrically controlled oil supply unit means integrated with the hydraulic supply for dynamically controlling the position of the control valve from a fully closed position to a fully open position and a range of positions therebetween, said actuators being controlled by said oil supply unit.

4,589,445

SPOUT OPERATED VALVE

Ricardo B. Sanchez Aguilar, Escocia 32, Col. del Valle, Del. Benito Juarez, 03100, Mexico City; Francisco R. Mendez, Calzada Arenal 477, Col Tepepan, Xochimilco, Mexico City; Luis F. Equihua Zamora, Fidel 12, 2a col del Periodista, CP 03620, Mexico City, and Carlos D. Soto Curiel, Cerrada de Amatista 5, Col Valle Escondido, Tlalpan, Mexico City, all of Mexico

Filed Jan. 27, 1984, Ser. No. 574,762
Int. Cl.[4] F16K *3/00*
U.S. Cl. 137—616.7 **8 Claims**



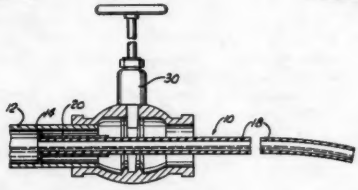
1. A faucet assembly comprising,
a pair of cylindrical body members removably secured together and having confronting faces in sealing engagement,
a first body member of said pair adapted for rotation relative to the second body member of said pair about an axis extending longitudinally through said pair of body members,
a spout having a passageway therethrough, one end of said spout being open for the exit of fluid passing through said passageway, the other end of said spout secured to and in fluid communication with said first body member,
said first body member having an opening in said confronting face,
said first body member having a passageway with one end of said passageway in communication with said opening in said confronting face and the other end of said passageway being in communication with the passageway of said spout,
said second body member having an opening in said confronting face,
said second body member having a passageway therein with one end of said passageway in communication with said opening in said confronting face,
said second body member including means for connecting said second body member to a fluid source,
said connecting means comprising a fluid inlet tube having one end secured to said second body member and being in communication with the other end of said passageway in said second body member, the other end of said inlet tube having an outwardly extending lip about its periphery,
an inner tube disposed within the lower portion of said inlet tube, said inner tube having an outwardly extending lip about its periphery in contact with said lip of said inlet tube,
fluid seal means disposed between the outer surface of said inner tube and the inner surface of said inlet tube to prevent passage of fluid through said surfaces,
a helm having a passageway therethrough and adapted to be secured to an outlet for said fluid source,
fastening means securing the upper surface of said helm to the lips of said inlet tube and said inner tube,
whereby when said spout on said first body member rotates said first body member relative to said second body member so as to place said openings in said confronting faces of said body members in direct fluid communication with each other, fluid from said fluid source flows through said passageways and out of said spout, and when said spout rotates said first body member in the opposite direction, said openings in said confronting faces are moved out of communication with each other so that fluid no longer flows between said body member and out of said spout.

4,589,446

PIPE REPAIR BYPASS APPARATUS

Gordon L. Allen, 12994 Cherry La., Chesterland, Ohio 44026

Filed May 2, 1985, Ser. No. 729,982
Int. Cl.[4] F16L *55/16*
U.S. Cl. 138—97 **2 Claims**



1. A pipe repair bypass apparatus, comprising:
at least one flexible non-metallic disc stop means having outer dimensions slightly larger than the inside dimensions of pipe to be repaired by soldering for insertion into pipe to partially block the flow of liquid through the pipe, said stop means having an opening therethrough;
elongated flexible tubing having one end section thereof secured to said stop means and extending through said opening with the passageway of said tubing being unobstructed to allow flow of liquid across said stop means; and
rigid tube member insertion means slidable on and surrounding said tubing at said one end section thereof and abutting said stop means for inserting said stop means and said tubing into the confines of pipe to be repaired.

4,589,447

METHOD OF DEPOSITING A MEMBRANE WITHIN A CONDUIT

John L. Kane, and G. Richard Machlan, both of Newark, Ohio, assignors to Owens-Corning Fiberglas Corporation, Toledo, Ohio

Continuation of Ser. No. 519,939, Aug. 3, 1983, abandoned. This application Apr. 12, 1985, Ser. No. 722,974
Int. Cl.[4] F16L *55/16*
U.S. Cl. 138—98 **8 Claims**

1. A method of repairing a rigid conduit having a damaged section in the form of holes, cracks and the like comprising:
(a) torsionally loading a longituddinally extending closely

wound uniform outside diameter resilient coiled member to decrease the outside diameter of said member to a diameter less than the inside diameter of said conduit and to increase the length of said member;

(b) positioning said torsionally loaded member in said conduit at said damaged section;

(c) positioning a sleeve of elastomeric material between said torsionally loaded member and the damaged section of the conduit;

(d) releasing said load to permit said member to radially expand and decrease in length in said conduit at said damaged section, said coiled member having a length, thickness and expansion force suffiecient to (1) force the sleeve against the interior of the conduit at the damaged section to seal said damaged sction and (2) structurally support said damaged section of conduit; and

(e) leaving said radially expanded member in said conduit as a reparir of said damaged section.

6. In a method of repairing a damaged section of a sewage conduit having an inside diameter from about 2 to about 15 inches, the improvement comprising:

(a) twisting and longitudinally extending a longituddinally extending closedly wound uniform outside diameter resilient helically coiled member to simultaneously (1) decrease the outside diameter of the member to less than the inside diameter of the conduit and (2) to increase the length of the coiled member;

(b) positioning said twisted and extended member in said conduit at the damaged section; and

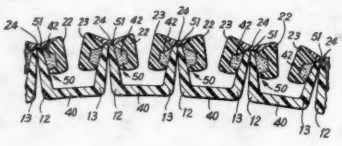
(c) releasing said member to permit said member to radially expand and decrease in length to contact said damaged section, said coiled member having a length, thickness and expansion force sufficient to (1) at least partially seal such damaged section and (2) structurally support said damaged section of conduit whereby a permanent repair of the damaged section is effected.

4,589,448

FLEXIBLE HELICALLY WOUND HOSE WITH HINGED STRIP

Jorge L. del Valle, Burlington, N.C., assignor to Electrolux Corporation, Stamford, Conn.

Filed Jul. 25, 1984, Ser. No. 634,477
Int. Cl.[4] F16L *11/11*
U.S. Cl. 138—122 **13 Claims**



1. A flexible hose, comprising:

an elongated base member of a first polymeric material, said base member having a base web portion including parallel longitudinally extending margins, and first and second wall portions each having inward and outward faces extending along said base member projecting in substantially the same direction from the margins of said base web portion, said base member being substantially helically wound to form a tube, said wall portions extending substantially radially outwardly from the longitudinal axis of said tube, an outward face of said first wall portion of said base member in a first convolution being adjacent to an outward face of said second wall portion of said base member in a second convolution, said first and second wall portions thereby forming a continuous helical rib along said tube; and

an elongaged cap member having a cap web portion including parallel longitudinally extending margins, and first and second flange portions extending along said cap member projecting in substantially the same direction from the margins of said cap web portion, said cap member being wound on said rib, said first and second flange portions extending radially inward toward said longitudinal axis along respective opposite sides of said rib to a radially inwardmost point of contact with said first and second wall portions, each of said first and second flange portions being bound to a respective one of said first and second wall portions by a binding material which is deposited substantially only in the region defined by said inward faces of said first and second wall portions and said cap member, said adjacent outward faces of said first and second wall portions being substantially free of binding material at least between said margins of said base web portion and a point substantially radially outward of said inwardmost point of contact;

said flange portions comprising a second polymeric material and said cap web portion comprising a hinge section of a third polymeric material coextruded with said flange portions, said hinge section having a thickness substantially less than the thickness of said flange portions, whereby said cap member flexes to permit separation of said adjacent first and second wall portions along their widths when said hose is flexed.

13. A flexible hose, comprising:

an elongated base member of a first polymeric material, said first polymeric material being a mixture of linear low density polyethylene and a polyethylene copolymer selected from the group consisting of ethylene-vinyl acetate copolymer, ethylene-ethyl acrylate copolymer, and mixtures thereof, said base member having a base web portion including parallel longitudinally extending margins, and first and second wall portions each having inward and outward faces extending along said base member substantially perpendicularly from the margins of said base web portion in substantially the same direction, said base member being substantially helically wound to form a tube, said wall portions extending substantially radially outwardly from the longitudinal axis of said tube, an outward face of said first wall portion of said base member in a first convolution being adjacent to an outward face of said second wall portion of said base member in a second convolution, said first and second wall portions thereby forming a continuous helical rib along said tube; and

an elongated cap member having a cap web portion including parallel longitudinally extending margins, and first and second flange portions extending along said cap member substantially perpendicularly from the margins of said cap web portion in substantially the same direction, said cap member being wound on said rib, said first and second flange portions extending radially inwardly toward said longitudinal axis along respective opposite sides of said rib, each of said first and second flange portions being bound to a respective one of said first and second wall portions by a hot melt material which is extruded substantially only into the region defined by said inward faces of said first and second wall portions and said cap member, said adjacent outward faces of said first and second wall portions being substantially free of binding material;

said flange portions and said hot melt material being made of said first polymeric material and said cap web portion comprising a hinge section of a second polymeric material coextruded with said flange portions, said second polymeric material being harder than said first polymeric

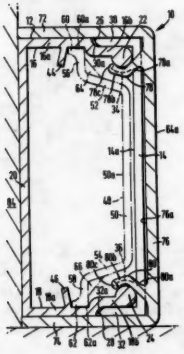
material and comprising about 70% high modulus polypropylene and about 30% of said first polymeric material, by weight, said hinge section having a thickness substantially less than the thickness of said flange portions, whereby said cap member flexes to permit separation of said adjacent outward faces of said first and second wall portions along their widths when said hose is flexed.

4,589,449

TRUNKING

David W. Bramwell, 4, Bosworth Grove. Prestatyn, Clwyd, North Wales, Wales

Filed Aug. 23, 1984, Ser. No. 644,214
Int. Cl.[4] F16L 9/22
U.S. Cl. 138—162 **9 Claims**



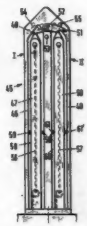
1. Trunking comprising an elongate channel member, an elongate cover member, the cover member releasably engaging and closing the channel member, the channel member having a base wall and first and second opposed side walls having free, elongate edge regions, said cover member having a top surface terminating in longitudinal side wall portions shaped to fit over said free edge regions of said channel member, connector means for connecting two, spaced apart cover members on at least one length of channel member, the connector means comprising opposed side walls joined by a top wall so dimensioned that the opposed side walls are a sliding fit over both the opposed side walls of said channel member and the opposed side walls of said cover member, said elongate edge regions of said channel member forming first engagement means for engaging said cover member, said cover member being provided with two elongate projections extending from the inner face thereof and substantially parallel to said longitudinal side wall portions, each longitudinal side wall portion and an associated one of said projections forming second engagement means for engaging the first engagement means, whereby said cover member can be placed on said channel member and snapped into engagement therewith by engagement of said second engagement means around said first engagement means, each side wall of said channel member having a first wall portion extending substantially normal to said base wall and a second wall portion including the elongate edge region spaced inwardly of said first wall portion such that when the channel member is closed by the cover member the external surfaces of the corresponding first portion of a wall of the channel member and a longitudinal edge portion of the cover member are in contiguous relationship, and the trunking further comprising retaining means for retaining cable and the like in said channel member, said retaining means comprising a longitudinal projection extending inwardly from each of said opposed side walls of said channel member and substantially parallel to said base wall arranged to support a cable retaining member extending across the channel member, and the cable retaining member is generally channel shaped having a generally planar central wall portion which is, in use, positioned in spaced-parallel relation to the top surface of said cover member, and side walls which extend from said generally planar central wall portion and are provided with edge portions engageable with said longitudinal projections.

4,589,450

LENO ATTACHMENT FOR A WEAVING MACHINE

Franz Eisenlohr, Tuttwil, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed May 7, 1985, Ser. No. 731,505
Claims priority, application 05101984, May 10, 1984, 84105316.8
Int. Cl.[4] D03D 47/40
U.S. Cl. 139—54 **20 Claims**



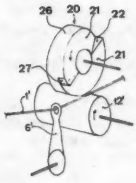
1. A leno attachment for a weaving machine comprising
a stationary carrier having at least one pair of spaced apart yarn lanes for guiding a leno yarn transversely therethrough and a passage communicating said lanes in end-to-end relation;
a needle disposed in a plane located between said yarn lanes for guiding a standing yarn transversely therethrough; and
deflecting means mounted on said carrier in alignment with said passage for guiding a leno yarn from at least one yarn lane through said passage to the other yarn lane in synchronism with a shed change in the weaving machine whereby the leno yarn crosses over the standing yarn.

4,589,451

WEFT MEASURING DEVICE FOR WEAVING LOOM

Albert Moessinger, Epalinges, Switzerland, and Joël Angebault, Riedisheim, France, assignors to Societe Alsacienne de Construction de Material Textile, Mulhouse, France

Filed Jul. 30, 1984, Ser. No. 635,740
Claims priority, application France, Aug. 2, 1983, 83 12931
Int. Cl.[4] D03D 47/34
U.S. Cl. 139—452 **14 Claims**



1. A weft measuring device for weaving looms, comprising:
a guiding element for guiding a weft yarn;
a pair of rotationally driven propelling rollers disposed adjacent one another and forming a gripping line therebetween into which said guiding element intermittently introduces the weft yarn;
means for actuating said guiding element to guide said weft

yarn intermittently into and out of said gripping line in regular and synchronous relation to a weft casting program of the loom; and

wherein at least one of said rollers is provided with means for moving an end of the gripping line toward which the weft yarn is conveyed at the start of a measurement cycle regularly and synchronously in cycle with the loom.

4,589,452

METHOD AND DEVICE FOR FILLING AN AEROSOL CAN WITH TWO COMPARTMENTS

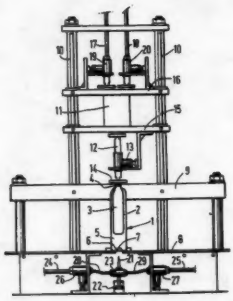
Frank Clanet, 4 bis, Sentier des Voisinoux, 92190 Meudon-Bellevue, France

Filed Nov. 30, 1984, Ser. No. 677,075

Claims priority, application France, Dec. 1, 1983, 83 19239

Int. Cl.[4] B65B *3/04*

U.S. Cl. 141—3 **18 Claims**



1. A method for filling an aerosol can of the type having first and second compartments separated by a flexible or mobile partition and having a valve connected to said first compartment, comprising the steps of:

providing a metering device for metering a substance to be packaged in said can;

removing the air in said first compartment;

moving the substance from said metering device to said first compartment in a manner such that said substance does not come into contact with the atmosphere;

sealing said first compartment; and

introducing a propellant means into said second compartment.

4,589,453

CONTAINER FILLING DEVICE

Wilhelm Weiss, Regensburg, Fed. Rep. of Germany, assignor to Krones AG Hermann Kronseder Maschinenfabrik, Neutraubling, Fed. Rep. of Germany

Filed Aug. 1, 1985, Ser. No. 761,153

Claims priority, application Fed. Rep. of Germany, Aug. 9, 1984, 3429314

Int. Cl.[4] B65B *31/00*

U.S. Cl. 141—39 **7 Claims**

1. A counterpressure container filler having a tank for containing liquid and gas under pressure and a container filling device, said device including,

a body having a passageway for conducting liquid from said tank to a container that is to be filled,

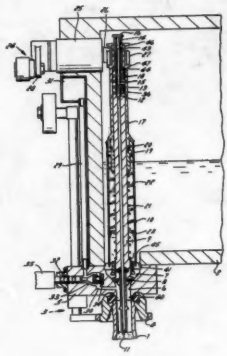
a gas conducting tubular member for conducting gas bidirectionally between said tank and container, said member terminating in the container with an opening at the level to which the container should be filled,

a fluid valve for controlling the flow of liquid through said passageway from said tank to said container,

a gas valve for controlling the flow of gas through said tubular member,

a source of gas at a pressure slightly higher than the pressure in said tank and a check valve through which said source is coupled to said passageway,

control means operative to keep said gas valve forced open after said container has been filled to said level or above said level independently of pressure conditions in the said tank and container, and



means for opening said check valve momentarily for injecting pressurized gas from said source into said passageway and container while said gas valve is still held open for said gas to force any liquid above said level in the container out through said tubular member and into said tank before said gas valve is closed.

4,589,454

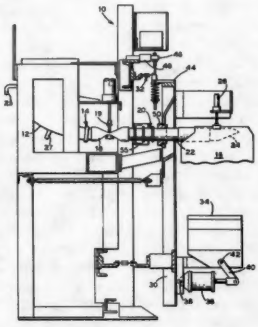
VALVE BAG FILLING CONDUIT

Robert G. Kelley, South Jordan, Utah, assignor to Champion International Corporation, Stamford, Conn.

Filed Mar. 11, 1985, Ser. No. 710,369

Int. Cl.[4] B65B *3/04*

U.S. Cl. 141—68 **7 Claims**



2. In a filling machine for packaging divided solid material having a conduit, and means feeding the material under pressure through the conduit into a packaging container, the improvement which comprises an elastic liner in the conduit extending along a part of the length of and having its opposite ends secured to the conduit and cooperating with the conduit to form a cavity, and means including a vent formed in the conduit and opening to the cavity for outwardly expanding the liner into contact with the inner surface of the conduit when material is flowing through the conduit and inwardly contract-

ing the liner when there is no flow of material through the conduit, thereby flexing the liner to crack and break off material adhering to the inner surface of the liner.

4,589,455

FLUID INJECTION DEVICE FOR TRANSMITTING FLUID

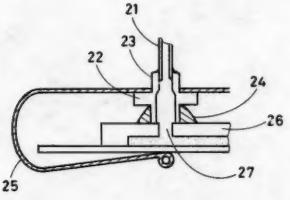
Youzi Ohno, Nara; Yoshiaki Sato, Tenri; Yoshito Yamashita, and Etsuo Mizukami, both of Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 19, 1984, Ser. No. 662,599

Claims priority, application Japan, Oct. 28, 1983, 58-167867[U]; Jan. 31, 1984, 59-13303[U]; Apr. 18, 1984, 59-57641[U]

Int. Cl.⁴ B65B *3/04*

U.S. Cl. 141—311 R **3 Claims**



1. A fluid injection device for injecting fluid into an inlet of a receiver part from an opening of a fluid injection pipe comprising:

a joint pipe having a flange portion formed between an opening therein for receipt of a tip portion of said fluid injection pipe and an opening therein for introducing a fluid into said receiver part;

a clip freely mountable and removable, which elastically sandwiches said joint pipe by said flange to said inlet of said fluid receiver part to cause said respective opening in said joint pipe to be tightly pressed against said inlet of said fluid receiver part; and

a rubber pad installed about a circumference of a tip portion of said joint pipe where said joint pipe is tightly pressed against said fluid receiver part.

4,589,456

APPARATUS FOR PRODUCING SQUARED TIMBERS BY MEANS OF NON-CHIP SEVERING OF BOARDS THEREFROM

Josef Traben, Oberkirch, Fed. Rep. of Germany, assignor to Gebrüder Linck, Maschinenfabric u. Eisengiesserei "Gatterlinck", Fed. Rep. of Germany

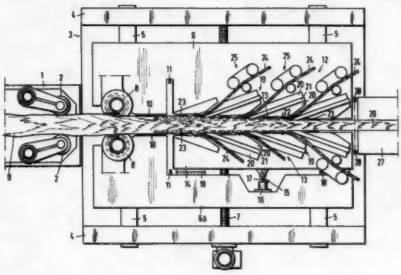
Filed Nov. 29, 1984, Ser. No. 676,000

Claims priority, application Fed. Rep. of Germany, Nov. 28, 1983, 3343294

Int. Cl.⁴ B27L *9/00*

U.S. Cl. 144—3 P **11 Claims**

1. In an apparatus for producing timbers from elongated round or substantially round timber logs, said apparatus having a feed means for receiving and advancing the log axially in a longitudinal direction, and processing means for removing portions from the log without forming cuttings, said processing means including two spaced opposed banks of staggered cutters that are respectively disposed progressively closer to the longitudinal axis of the log in a direction of advance of the log through the processing means, said processing means including means for oscillating the banks of cutters for separating portions from the log as the log is advanced therethrough, each of the cutters of each of the banks having a pressure pad immediately adjacent and preceding a cutting edge of the cutter and a guide strip in front of the pressure pad and following the next earlier cutter, the improvements comprising first means for rigidly mounting a first of the two banks of cutters in a frame for adjustment to desired positions and second means for mounting the second bank of cutter in the frame for adjustment



opposite the first bank, said second means having means for urging the second bank toward the first bank with a predetermined pressure.

4,589,457

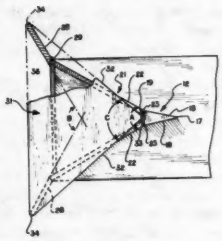
LOG SPLITTER WEDGE CONSTRUCTION

Phillip M. Schmidt, 117 Centennial St., and Kenneth P. Schmidt, 3462 Austin Rd., both of Geneva, Ohio 44041

Filed Jan. 4, 1985, Ser. No. 688,803

Int. Cl.⁴ B27L *7/00*

U.S. Cl. 144—193 E **6 Claims**



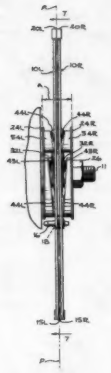
1. A log splitter comprising a frame, a splitting wedge on said frame, and a power means on said frame operable to cause said wedge to penetrate a log, said wedge including a knife portion providing a cutting edge extending substantially perpendicular to the direction of penetration, said knife portion providing knife side walls which intersect at said edge and diverge rearwardly therefrom at a first relatively small angle, a first spreader rearwardly of said knife providing first and second spreader side walls diverging rearwardly from associated of said knife side walls at a second angle greater than said first angle and operable to engage and open the end of a log passing over said knife, a second spreader providing third and fourth diverging side walls extending rearwardly from the associated of said first and second spreader side walls and diverging at a third angle greater than said second angle, and a plate mounted along the side of said spreaders remote from said frame, said plate providing lateral edges which diverge from the forward end substantially adjacent said knife at a fourth angle greater than said second angle, said plate operating with said frame to provide lateral support for said diverging walls, said lateral edges operating to prevent lifting of logs being split by said wedge.

4,589,458

MULTIPLE SAW BLADE ADJUSTABLE DADO CUTTER

Wilfred M. McCord, Jr., Louisville, Ky., assignor to Vermont American Corporation, Louisville, Ky.

Filed Oct. 29, 1984, Ser. No. 665,737
Int. Cl.[4] B27B *33/00*
U.S. Cl. 144—238 15 Claims



5. A multiple saw blade adjustable dado cutting assembly comprising:

(a) a pair of circular saw blades including a central opening;

(b) central hub means rotatable on an axis supporting said saw blades adjacent to each side of a central plane perpendicular to said axis; and

(c) saw blade adjusting means on said central hub means interactionable with means on said saw blades for causing relative movement between said saw blades and said plane so that dados of various selected widths can be cut by rotation of said supporting axis,

(d) said saw blades being slectively movable by said saw blade adjusting means between a minimum dado cutting position, wherein said saw blades are juxtaposed to said plane and parallel to said plane and to each other with both of their diametrically opposite first and second edges adjacent to each other, and wider dado cutting positions, wherein said saw blades are pivoted about first points respectively located on each of said first peripheral edges of said saw blades to selectively adjust spacing along said axis between second points respectively located on said diametrically opposite second peripheral edges of each of said saw blades adjacent to each other,

(e) said saw blade adjusting means comprising cam means,

(f) said cam means being positioned between said saw blades,

(g) said cam means including means diverging outwardly along said axis, and

(h) said cam means being on said central hub means and being interactionable with cam follower means on said saw blades for causing said relative movement between said saw blades and said plane.

4,589,459

VEHICLE PROTECTIVE COVER

Larry J. Lantrip, Cocolalla, Id., assignor to Mervyn Shapiro, Sagle, Id., a part interest

Filed Jan. 24, 1985, Ser. No. 694,431
Int. Cl.[4] B60J *11/00*
U.S. Cl. 150—52 K 13 Claims

1. A protective cover for use on a vehicle having a passenger side with passenger door, driver side with driver door, hood, windshield, front end and rear end; comprising:

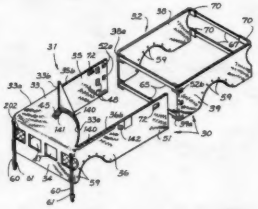
a front portion for covering and protecting frontal parts of the vehicle; said front portion having a passenger front side panel, a driver front side panel, a hood panel and a front panel;

the front panel being integrally connected to the hood panel only along a top edge of the front panel and a front edge of the hood panel;

the front panel also being integrally connected to the passenger and driver front side panels only along side edges of the front panel and front edges of the side panels;

the hood panel extending continuously rearward from the front edge thereof to a rear edge thereof;

the hood panel being unconnected from said front side panels along side edges of the hood panel except at detachable connection means adapted to allow adjustable connection of the hood panel to the front side panels at the rear edge of the hood panel and adjacent the vehicle windshield, to allow adjustable tightening of the hood panel along the rear edge;



the passenger and driver front side panels extending rearwardly from the front edges thereof in a continuous protective layer to at least the rear edges of said passenger and driver doors, respectively, passenger and driver front side panels having attachment clips for connection to said doors along said rear edges thereof;

a rear portion for covering and protecting rear parts of the vehicle; said rear portion having at least two rear side panels for extending along exterior side walls of the vehicle;

rear portion connection means extending across the rear end of the vehicle for detachably connecting the rear side panels together so that the rear side panels can be adjustably drawn taut along the sides of the vehicle; and

means for securing front edges of the rear side panels to said vehicle;

whereby the front, hood and sides of the vehicle are protected against scratching by brush, rocks, and other objects.

4,589,460

OFF ROAD VEHICLES

William H. Albee, 1524 Spring Brook, Walnut Creek, Calif. 94596

Continuation-in-part of Ser. No. 866,773, Jan. 3, 1978, abandoned. This application Dec. 24, 1980, Ser. No. 219,599
Int. Cl.[4] B60C *3/00, 9/08, 9/22*
U.S. Cl. 152—170 11 Claims

1. A flexible-walled, fluid-distensible, axially elongated, load sustaining bag roller, said roller comprising,

a mid-section,

two opposite end sections,

an inner, fluid-containing rubber layer extending in a substantially uniform covering over the entire inner surface of the mid-section and end sections,

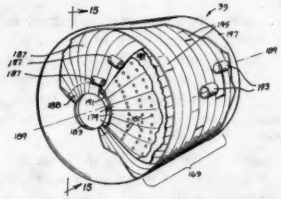
bead means in each end section for mounting the roller on a hub for rotation about a longitudinal axis,

carcass means for providing tensile reinforcement to the bag roller,

said carcass means including one or more layers of longitudinal radial tire cords with each cord fastened at one end to

one bead means and at the other end to the other bead means and with each longitudinal radial cord extending between the bead means free of splices and wherein each cord is substantially entirely disposed in an individual plane extending through said longitudinal axis so that the part of each cord in the mid-section extends essentially parallel to the longitudinal axis and the parts of each cord in the end sections extend essentially radially to said longitudinal axis and wherein all layers of longitudinal radial cords are contiguous to one another without any interspersing layers of circumferential cords,

said carcass means also including one or more layers of circumferential tire cords in the mid-section with each circumferential cord disposed substantially entirely within an individual plane extending perpendicular to said longitudinal axis and wherein all layers of circumferential cords are contiguous to one another without any interspersing layers of longitudinal radial tension cords,



said mid-section being constructed to form substantially a right-circular cylinder when the roller is fully distended without being subjected to any load to thereby provide a cylindrical tread area for the full length of the mid-section with the bead means outboard of the tread area in the mid-section,

said layer or layers of longitudinal radial tire cords being free of load carrying cords oriented in other than the longitudinal radial direction,

said layer or layers of circumferential tire cords being free of load carrying cords oriented in other than the circumferential direction,

said bag roller comprising no layers of cords other than said longitudinal radial tire cords and said circumerfential tire cords so that maximum flexibility is retained in said carcass means,

and an outer layer of wear-resistant rubber.

4,589,461

PNEUMATIC BELTED TIRES

Shinichiro Ohkuni, Akishima, and Yoichi Kitazawa, Higashiyamato, both of Japan, assignors to Bridgestone Corporation, Tokyo, Japan

Filed Jun. 27, 1984, Ser. No. 625,080

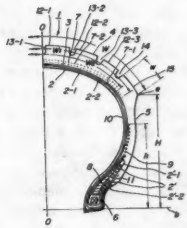
Claims priority, application Japan, Jul. 19, 1983, 58-130242

Int. Cl.⁴ B60C *9/20, 9/28, 11/06*

U.S. Cl. 152—209 R **5 Claims**

1. A pneumatic belted tire for use in motorcycles comprising a toroidal carcass composed of at least one rubberized ply containing fiber cords arranged at an inclination angle of 50°–90° with respect to the equatorial plane of the tire, a tread superimposed about a crown region of the carcass along the sectional contour thereof so as to extend near the positions corresponding to the maximum width of the carcass and provided on its outer surface with a tread pattern including a circumferential groove continuously extending at each shoulder portion of the tread and a substantially continuous rib defined between the circumferential groove and the tread edge, and a belt arranged along the sectional contour of the crown region between the carcass and the tread and composed of plural rubberized layers each containing inextensible cords arranged at an inclination angle of not more than 30° with respect to the equatorial plane of the tire, the cords of which layers being crossed with each other;

said belt having such a cord pass that said inclination angle of the cord in the belt enlarges within a range of 7°–20° from the center of the crown region toward the side edge of the tread; and



said rib in the tread having a width corresponding to 5–25% of the tread width; and

each of lateral edges of said belt being located at a position corresponding to right underside of the circumferential rib.

4,589,462

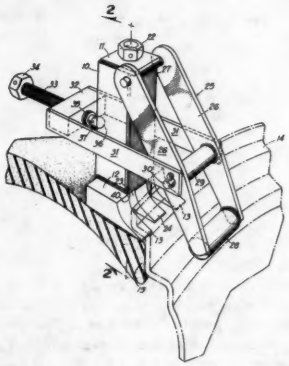
TIRE BEAD BREAKER TOOL

John Giles, P.O. Box 70503, Marietta, Ga. 30007-0503

Continuation of Ser. No. 455,299, Jan. 3, 1983, abandoned, which is a continuation of Ser. No. 202,723, Oct. 31, 1980, abandoned. This application Dec. 16, 1983, Ser. No. 562,112

Int. Cl.⁴ B60C *25/06*

U.S. Cl. 157—1.17 **2 Claims**



1. A tire bead breaker tool comprising a pair of inner and outer telescopically interfitting sleeves of polygonal cross-section adapted for relative axial movement, a breaker screw threadedly engaged with the inner sleeve to drive the inner sleeve axially of the outer sleeve and having a rotational connection with the outer sleeve, including a collar and a thrust bearing which is provided to minimize friction, a single bead breaker wedge foot on the end of the inner sleeve away from the threaded connection of said screw with the inner sleeve, a pair of rim engaging wedge feet on the corresponding last-named end of the outer sleeve in parallel straddling relationship to the single wedgefoot, a rigid rim clamp bar unit having two spaced parallel arms which are integrally connected to a spacer sleeve near their midpoints, said unit being disposed bodily on the forward side of the outer sleeve and having one

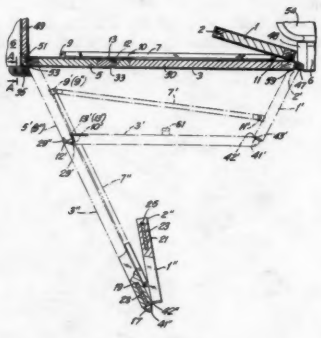
end thereof pivotally attached to the outer sleeve near the end of the outer sleeve away from said wedge feet, the other end of the rim clamp bar unit carrying a cylindrical rim surface engaging element integrally connected between said arms substantially in opposing relationship to said wedge feet, a yoke formed separately from the rim clamp bar and including spaced side members straddling and extending across the outer sleeve generally at right angles to the axis of the outer sleeve, means pivotally interconnecting said clamp bar unit with said yoke near the longitudinal center of the clamp bar forwardly of the forward side of the outer sleeve and near corresponding ends of the spaced side members of the yoke, the yoke further including a crosshead integrally connected with said side members on its end away from the clamp bar unit and spaced from the rear side of the outer sleeve, a clamp bar unit operating screw threadedly engaged within the cross head and having a ball and socket rotational connection with said outersleeve and being operable to place said side members under tension and create an inherently stable condition within said yoke and draw the cylindrical rim surface engaging element into engagement with the rim.

4,589,463

EXPANDABLE VOLUME LAVATORY

James M. Ryan, New York, N.Y., assignor to Falcon Jet Corporation, Teterboro, N.J.

Filed Sep. 28, 1984, Ser. No. 655,517
Int. Cl.[4] E06B *3/32*; E05D *15/00*
U.S. Cl. 160—88 **11 Claims**



1. A room, comprising:

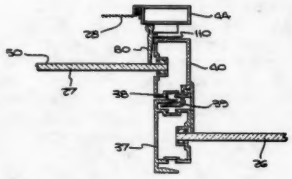
a walled area enclosing a lavatory; a door-opening through said walled area; and a door having at least first, second, and third door panels; wherein said first door panel is pivotally mounted along a first edge thereof to a first edge of said door opening and at a second edge along a first edge of said second door panel, said second door panel being further pivotally mounted along a second edge thereof to a first edge of said third door panel, such that said door may be disposed in a first configuration having said first and second door panels substantially co-planar while said second edge of said second door panel is in mating engagement about a second edge of said door opening, said third door panel being then positioned within said walled area and wherein said door may be disposed in a second configuration wherein a second edge of said third door panel is in mating engagement about said second edge of said door opening, said first, second and third door panels being all positioned outside of said walled area, said room in said second configuration having a greater volume of of enclosure than said room in said first configuration.

4,589,464

INSECT BARRIER MEANS FOR SLIDING DOOR CONSTRUCTIONS

John H. Coller, La Puente, Calif., assignor to D. G. Shelter Products Company, City of Industry, Calif.

Filed Jul. 25, 1984, Ser. No. 634,368
Int. Cl.[4] E06B *3/32*
U.S. Cl. 160—91 **9 Claims**



2. In a sliding door construction including two sliding door panels having panel surfaces lying in spaced parallel planes adapted to be moved into open position or into a position where one panel is open or partially open and the other panel is closed, each of said door panels having frame members in juxtaposed position when both panels are in relatively displaced position, the provision of:

a movable closure blade extending the length of said frame members and in closed position of said sliding panels extending normal to the plane of said panel surfaces and having a width for virtually closing the space between said panels;

and means carried by one of said frame members for actuating said closure blade into and out of operative position;

said means for actuating said movable blade includes a projection on said blade;

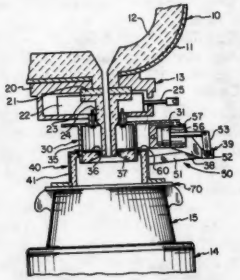
a cooperative projection on said frame member of one of said sliding panels adapted to contact said projection on said blade to move said blade from inoperative position parallel to one of the panel surfaces to an operative position normal to said panel surfaces.

4,589,465

TOP POUR SHROUD

Charles C. Gerding, Pittsburgh, and Harold L. Majors, Beaver Falls, both of Pa., assignors to LTV Steel Company, Inc., Cleveland, Ohio

Filed Dec. 14, 1983, Ser. No. 560,899
Int. Cl.[4] B22D *23/00*
U.S. Cl. 164—66.1 **18 Claims**



18. A method of teeming molten metal into ingot molds from a ladle havng a slide gate thereon comprising the steps for:

(1) providing an apparatus secured to the bottom of the slide gate having:

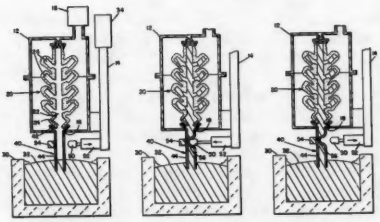
(a) a plenum box sealed to and extending downwardly from the sliding part of the slide gate;
(b) a hood telescopically extendable and retractable with respect to the plenum box and forming a rough sliding seal therewith, said hood having a skirt flange at the bottom thereof, the width of said skirt flange in the direction of movement of the slide gate being greater than the maximum slide gate movement;
(c) means fixed relative to the plenum box to extend and retract the hood to accommodate varying distances between the ladle and the ingot mold; and
(d) means for introducing a protective gas in the plenum box;
(2) purging the ingot molds and covering with a burn away temporary cover;
(3) placing the ladle over the ingot molds and lowering the hood; and
(4) opening the slide gate dragging the hood over the top of the ingot molds.

4,589,466

METAL CASTING

George D. Chandley, and Eugene W. Thomas, both of Amherst, N.H., assignors to Hitchiner Manufacturing Co., Inc., Milford, N.H.

Continuation-in-part of Ser. No. 583,828, Feb. 27, 1984, abandoned. This application May 28, 1985, Ser. No. 738,688
Int. Cl.⁴ B22D *18/04, 37/00*
U.S. Cl. 164—119 **12 Claims**



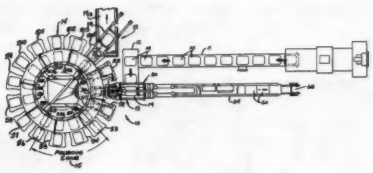
6. A method of casting in a gas permeable mold, comprising the steps of:
providing a gas permeable mold having a vertical passage with a lower open end for introducing molten metal into mold cavity means therein
providing a mold support having a lower opening positioned beneath said mold passage lower open end
providing a crucible for holding molten metal with its surface positioned beneath said mold support
providing a rigid, permanently crimpable metal fill pipe having a radially outwardly extending upper flange removeably sealingly interposed between and surrounding said mold passage lower open end and said mold support lower opening with its lower end extending vertically downwardly therefrom toward said crucible
relatively moving said mold and fill pipe toward said crucible to move the lower end of said fill pipe beneath the surface of molten metal in said crucible to introduce molten metal from said crucible into the lower end of said fill pipe
applying a differential pressure to said mold and crucible to cause said molten metal to fill said mold cavity means through said fill pipe,
crimping said fill pipe to close it after filling of said mold cavity means to prevent reverse flow of molten metal from said mold cavity means to said crucible as said mold and fill pipe are moved relatively away from said crucible, and finally
removing said fill pipe from said mold and support.

4,589,467

MOLD HANDLING SYSTEM

William A. Hunter, Inverness, Ill., assignor to Hunter Automated Machinery Corporation, Schaumburg, Ill.

Continuation-in-part of Ser. No. 636,817, Aug. 1, 1984. This application Sep. 12, 1984, Ser. No. 649,595
Int. Cl.⁴ B22D *5/02*
U.S. Cl. 164—326 **8 Claims**



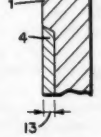
1. A mold handling system comprising
an indexing turntable for carrying a multiplicity of molds in concentric inner and outer rings with the outer ring located at a lower elevation than the inner ring,
a conveyor for transporting a multiplicity of molds to a mold transfer station adjacent said turntable, said transfer station including a mold transfer shuttle having a tandem pair of pusher plates of simultaneously (1) transferring a mold from the radial location of said outer ring of molds to the radial location of said inner ring of molds on said turntable, and (2) transferring a new mold from said conveyor to the radial location of said outer ring of molds, said pusher plates directly engaging the respective molds transferred thereby, an elevator mechanism for transporting molds back and forth between said different elevations, the upard movement of said elevator mechanism lifting a mold from said outer ring to the elevation of said inner ring so that said shuttle mechanism transfers the lifted mold directly from said elevator mechanism to said inner ring while simultaneously transferring a new mold from said conveyor onto said elevator mechanism, and the downward movement of said elevator mechanism lowers said new mold into said outer ring,
a pouring station adjacent said turntable at a position downstream of said transfer station for filling the molds on the turntable with molten metal, and
a mold discharge station for removing molds from said turntable.

4,589,468

CONTINUOUS MOLD FOR A CONTINUOUS CASTING PLANT

Erich Misera, Asten; Hubert Floh, Hattmannsdorf, and Reinhard Haargassner, Linz, all of Austria, assignors to Voest-Alpine International Corporation, New York, N.Y.

Filed Nov. 1, 1983, Ser. No. 547,720
Claims priority, application Austria, Nov. 4, 1982, 4023/82; Apr. 13, 1983, 1320/83
Int. Cl.⁴ B22D *11/00*
U.S. Cl. 164—418 **25 Claims**



1. A continuous mold for a continuous casting plant comprising

inner walls made from copper and/or an alloy of copper;
a wear resistant layer disposed on the copper and/or alloy of copper on the exposed inner side of the mold and which layer covers at most two fifths of the total surface of a side wall and which reaches from the output end of the continuous mold up to about one third of the length of the mold at the center of the respective side of the mold and which wear resistant layer reaches in the area of the inner edges of the mold from the output end of the continuous mold to at least about the same level as the layer at the center of the respective side and up to the input end of the mold, wherein the wear resistant layer is welded to its support and wherein the wear resistant layer comprises from about 0.1 to 1.5 weight percent carbon, from about 2 to 20 weight percent chromium, from about 0.5 to 15 weight percent molybdenum, up to about 5 weight percent tungsten, up to about 5 weight percent vanadium, and up to about 5 weight percent niobium, with the remainder being iron and impurities resulting from the melting process;
and wherein an intermediate layer disposed between the wear resistant layer and the inner wall and placed on the inner wall of the mold and wherein the intermediate layer comprises from about 1 to 5 weight percent manganese, from about 0.5 to 1.5 weight percent silicon, from about 20 to 50 weight percent copper, up to about 5 weight percent niobium, up to about 5 weight percent iron, up to about 5 weight percent titanium with the balance being nickel as well as impurities caused by the melting step.

4,589,469

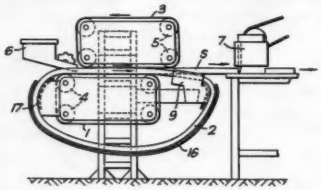
ELECTROLYTIC REFINING OF METAL

William Nelson, Birkenhead, and John P. Bearpark, Lymm, both of United Kingdom, assignors to BICC Public Limited Company, London, England

Division of Ser. No. 392,762, Jun. 28, 1982, Pat. No. 4,498,522, which is a continuation of Ser. No. 180,000, Aug. 21, 1978, abandoned, which is a continuation of Ser. No. 897,355, Apr. 18, 1978, abandoned. This application Jul. 6, 1984, Ser. No. 628,622

Int. Cl.⁴ B22D *11/06*

U.S. Cl. 164—460 **27 Claims**



1. A method of forming unrefined electrodes in quantity for use in the electrolytic refining of metal, which method comprises continuously casting molten metal into a mould formed at least in part by a moving endless belt which provides a supporting surface for molten metal and two laterally spaced moving edge dams, which are positioned immediately above the belt to form a cast strip, at least one of said edge dams having a portion extending transversely of the molten metal being cast so as to form in each of a plurality of longitudinally spaced minor length zones of the strip, extending transversely of the strip forming at least one area, which area constitutes a major proportion of said minor length transversely extending zone and in which the thickness of metal is substantially less than that of a similar area of the strip between adjacent longitudinally spaced transversely extending zones; and cutting the strip so cast at positions spaced along its length and so related to said at least one area of each transversely extending zone of the strip as to form a plurality of unrefined electrodes, each of which electrodes has, in that portion of the electrode that will protrude above the level of the electrolyte solution when the electrode is supported in an electrolytic cell, said at least one area which constitutes a major proportion of said protruding portion of the electrode and in which the amount of metal is substantially less than that in a similar area of the main body of the electrode.

4,589,470

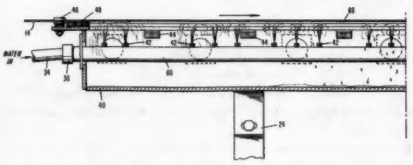
METHOD AND APPARATUS FOR COOLING A MOVING CHILL SUBSTRATE

John R. Bedell; Paul G. Friedmann, both of Madison, N.J.; Julian H. Kushnick; Eli Rosenthal, both of Brooklyn, N.Y.; James R. Hubbard, Budd Lake, and Christian J. Zingler, Succasunna, both of N.J., assignors to Electric Power Research Institute Inc., Palo Alto, Calif.

Continuation of Ser. No. 327,675, Dec. 4, 1981, abandoned. This application May 8, 1984, Ser. No. 608,079

Int. Cl.⁴ B22D *11/06, 11/124*

U.S. Cl. 164—463 **24 Claims**



1. A cooling process for continuous casting of molten solidifying material on a moving chill member having a casting surface for receiving said material and a converse surface, comprising the steps of:
providing a pressure gradient across said member for causing the pressure at said casting surface to exceed the pressure at said converse surface;
spraying a coolant against said converse surface following receipt of said material on said casting surface; and
scraping remanent coolant from said converse surface prior to said casting surface receiving said material;
whereby flow of said coolant from said converse surface to said casting surface is prevented and a chill rate sufficient for casting amorphous metal alloys is provided.

7. In an apparatus for continuous casting of a molten solidifying material on a moving chill member, the chill member including a casting surface for receiving material at a particular point thereon and a converse surface, the improvement comprising cooling means for cooling said chill member including:
pressurizing means for effecting a pressure gradient across said member wherein the pressure at said casting surface exceeds the pressure at said converse surface, and
spraying means for spraying a coolant pressurized above atmospheric pressure against said converse surface only downstream on said chill member from the point of receipt of said material on said casting surface, the coolant pressurization serving to increase scrubbing action provided by the spray at said converse surface of the chill member, thereby optimizing heat transfer efficiency,
said pressurizing means thereby preventing migration of said coolant from said converse surface to said casting surface.

4,589,471

METHOD FOR RAPID SOLIDIFICATION OF TITANIUM ALLOYS BY MELT EXTRACTION

Francis X. Gigliotti, Jr., Scotia; Lee C. Perocchi, Schenectady, and Peter G. Frischmann, Saratoga, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

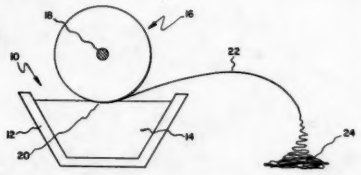
Filed Oct. 29, 1984, Ser. No. 665,901

Int. Cl.⁴ B22D *11/00*

U.S. Cl. 164—463 **6 Claims**

6. A method of continuously casting alloys of titanium which comprises
providing an alloy containing at least 60% by weight of

titanium, a rare earth and a significant percentage of at least one metal selected from the group consisting of molybdenum, tantalum and columbium,
forming a melt of the alloy,
providing a casting zone,



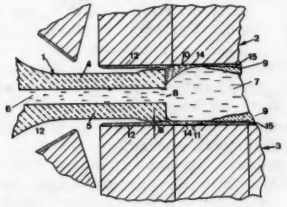
casting the alloy by continuously accreting a small quantity of the melt from the molten zone onto a casting surface composed predominantly of molybdenum,
quickly and continuously separating the cast metal from the molybdenum surface, and
furnishing molten alloy to the zone at a rate equivalent to that at which it is continuously removed by casting.

4,589,472

PROCESS FOR PREVENTING METAL PENETRATING BETWEEN A MOLD WALL AND A NOZZLE

Kurt Buxmann, Sierre, Switzerland, assignor to Swiss Aluminium Ltd., Chippis, Switzerland

Filed May 24, 1984, Ser. No. 613,632
Claims priority, application Switzerland, Jun. 1, 1983, 3009/83
Int. Cl.[4] B22D *11/06, 11/07*
U.S. Cl. 164—472 **3 Claims**



1. A process for preventing back flow of metal to a space between moving mold belts of a continuous casting mold and a nozzle for feeding molten metal to the mold formed by said moving mold belts comprising introducing a fluxing powder between the nozzle and the moving mold belts wherein the fluxing powder forms a protective skin on the surface of the molten metal downstream of the nozzle, said fluxing powder having a melting point which lies just below that of the metal being cast so that the protective skin formed by the fluxing powder becomes liquid on contact with the molten metal and solidifies in the region where the molten metal solidifies.

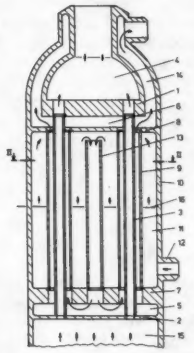
4,589,473

PROCESS AND HEAT EXCHANGER FOR COOLING GASES

Wolfgang Kehrer, Berlin, Fed. Rep. of Germany, assignor to Borsig GmbH, Berlin, Fed. Rep. of Germany

Filed Mar. 11, 1985, Ser. No. 710,501
Claims priority, application Fed. Rep. of Germany, Mar. 30, 1984, 3411795
Int. Cl.[4] F28D *7/10*; C10G *9/16*
U.S. Cl. 165—1 **5 Claims**

1. A process for cooling gases having components tending to form cake-type deposits during cooling comprising the steps of: producing a heat exchange of the gases to be cooled with a vaporizing cooling medium and an intermediate carrier passing through annular chambers between the gases and the cooling medium, said annular chambers being formed by double-walled tubes arranged within a chamber containing the cooling medium; vaporizing said cooling medium within said chamber by heat exchange with the gases to be cooled; and passing resulting vapor through said annular chambers as said intermediate carrier, said vaporized cooling medium exchanging heat with water or water vapor, said vaporized cooling medium flowing through said cooling medium tubes comprising an intermediate heat carrier medium for attaining substantially high temperatures on surfaces contacting said gases, said high temperatures reducing substantially deposits on pipe walls, said intermediate heat carrier medium being obtained from water used as cooling medium.

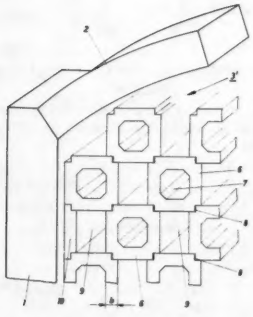


4,589,474

CHECKERWORK IN HORIZONTAL CHAMBER OF A REGENERATIVELY FIRED FURNACE

Josef Horak, Vienna, and Friedrich Kassegger, Wiener Neustadt, both of Austria, assignors to Veitscher Magnesitwerke-Actien-Gesellschaft, Vienna, Austria

Filed Oct. 11, 1983, Ser. No. 540,899
Claims priority, application Austria, Oct. 25, 1982, 3919/82
Int. Cl.[4] F28D *17/02*
U.S. Cl. 165—9.1 **3 Claims**



1. A checkerwork in a horizontal regenerator chamber of a regeneratively fired furnace, comprising an array of horizontally and vertically adjacent hollow prismatic bricks or refractory material, each brick having a horizontally extending longitudinal axis, a rectangular periphery and an axially extending

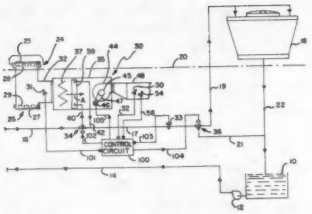
bore of rectangular cross section, the rectangular periphery of each brick defining a stepped recess extending substantially parallel to the longitudinal axis along each corner of the brick periphery, adjacent ones of the recesses in adjacent ones of the bricks engaging each other, the bore and periphery being defined by walls alternately absorbing heat from exhaust gas escaping from the furnace through the bore and transferring the heat to combustion air drawn therethrough, and the bricks being so spaced and arrayed in horizontal and vertical rows that each group of four horizontally and vertically adjacent bricks defineds not only four of said bores but an additional gas flow channel of rectangular cross section, vertical ones of said brick walls between the bores and gas flow channels being in vertical alignment whereby all vertical pressure forces exerted by an upper one of the horizontal rows of bricks upon a lower one of the rows are absorbed exclusively by the vertical brick walls while the bores and gas flow channels are free of pressure.

4,589,475

HEAT RECOVERY SYSTEM EMPLOYING A TEMPERATURE CONTROLLED VARIABLE SPEED FAN

William T. Jones, East Grand Rapids, Mich., assignor to Plant Specialties Company, Grand Rapids, Mich.

Filed May 2, 1983, Ser. No. 490,531
Int. Cl.[4] G05D *23/20*
U.S. Cl. 165—35 **8 Claims**



1. A heat recovery system for use in recovering heat from an industrial process producing a heated fluid comprising:

a source of inlet air;

a housing coupled to said source and including a heat exchanger;

means for passing said heated fluid through said heat exchanger;

said housing including means for moving a variable volume of air adjustable over a continuous range from said source through said heat exchanger;

air discharge means communicating with said housing for discharging air which has passed through said heat exchanger;

a control system including first temperature sensing means for sensing the discharge temperature of the discharge air moving through said discharge means and a control circuit coupled to said first temperature sensing means and to said moving means for varying the volume of air moved in response to the sensed discharge temperature to control the temperature of discharge air passing through said discharge means at a first predetermined value; and

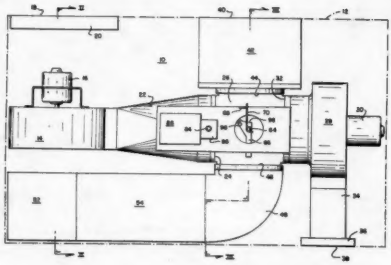
said control system including second temperature sensing means for sensing the temperature of said source of inlet air and valve means coupled to and controlled by said control circuit to cause liquid to bypass said heat exchanger when the inlet air temperature rises above a second predetermined value.

4,589,476

AIR VENTILATION AND FILTRATION APPARATUS

Erling Berner, Loretohohe 5, CH-6300 Zug, Switzerland

Filed May 16, 1985, Ser. No. 734,940
Int. Cl.[4] F24H *3/02*
U.S. Cl. 165—54 **3 Claims**



1. Apparatus for exchanging air within an enclosure with outside air while subjecting air within said enclosure to gas filtration comprising:

a housing;

ducting extending within said housing to provide a central chamber having four ports, each port being in communication with a port in said housing to establish four air flow channels;

exhaust fan means mounted in a first of said channels to produce air flow from said enclosure;

air supply fan means mounted in a second of said channels to produce air flow into said enclosure;

gas filtration means located in a third of said channels, said third channel being ported to said enclosure;

a heat storage matrix located in a fourth of said channels, said fourth channel being ported to outside air; and

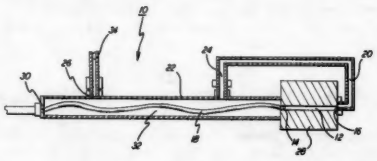
valve means disposed in said central chamber and being positionable with respect to said four ports within said chamber to establish a first operating mode in which said first channel is in air flow communication with said fourth channel and said third channel is in air flow communication with said second channel, and a second operating mode in which said first channel is in air flow communication with said third channel and said fourth channel is in air flow communication with said second channel.

4,589,477

SAMPLE CELL TEMPERATURE STABILIZER

Raymond P. W. Scott, Wilton, Conn., assignor to The Perkin-Elmer Corporation, Norwalk, Conn.

Filed Feb. 3, 1984, Ser. No. 576,660
Int. Cl.[4] F25B *29/00*
U.S. Cl. 165—66 **3 Claims**



1. In a liquid chromatograph, thermal stablizing apparatus comprising, in combination:

a flow cell with an inlet port and an outlet port;

an inlet conduit communicating with said inlet port, said inlet conduit comprising a two dimensional continuous

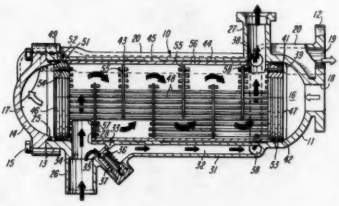
serpentine shaped conduit portion one end of which couples to said inlet port;

outlet conduit communicating with said outlet port and surrounding said serpentine shaped conduit portion, the column fluid passing through said inlet conduit, said flow cell and said outlet conduit so as to stabilize the temperature of the fluid as it passes through said flow cell.

4,589,478
PRESSURE PROTECTED TUBULAR HEAT EXCHANGER

John E. Wunder, Kettering, Ohio, assignor to United Aircraft Products, Inc., Dayton, Ohio

Filed Aug. 19, 1985, Ser. No. 766,512
Int. Cl.⁴ F28F *9/02*
U.S. Cl. 165—76 **7 Claims**

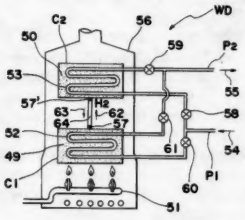


1. A heat exchanger of the tube and shell type, including a heat exchange core comprising spaced apart headers and interconnecting tubes, said tubes being attached to said headers, and a shell receiving said core, said shell having an inlet and an outlet for a first fluid and directing said first fluid to flow between the core headers over and around said tubes, a second fluid being directed to the external face of one of said headers for flow through said tubes, at least one of said fluids being under relatively high pressure, said core having an unbonded separable relation to said shell for unitary simplified core installation and removal, and means independent of said tubes for absorbing fluid pressure induced forces tending to effect relative separating and approaching motions of said headers.

4,589,479
HOT WATER SUPPLY UNIT

Takaharu Gamo, Fujiidera; Yoshio Moriwaki, Hirakata; Minoru Tagashira, Chigasaki, and Tadayasu Mitsumata, Hirakata, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed May 22, 1984, Ser. No. 612,784
Claims priority, application Japan, May 23, 1983, 58-89074; May 27, 1983, 58-94331; Jul. 12, 1983, 58-126501; Jul. 13, 1983, 58-128303; Aug. 22, 1983, 58-153489
Int. Cl.⁴ F25B *15/00*; F28D *21/00*
U.S. Cl. 165—104.12 **6 Claims**



1. A hot water supply unit comprising:

at least one first container containing a first metal hydride having a low hydrogen equilibrium dissociation pressure;

at least one second container containing a second metal hydride having a hydrogen equilibrium dissociation pressure which is greater than the hydrogen dissociation pressure of said first metal hydride;

said at least one second container being disposed above said at least one first container;

connection means for passage of hydrogen gas between said at least one first container and said at least one second container;

heating means disposed adjacent and below said at least one first container for heating said at least one first container and indirectly heating said at least one second container through rising heat not consumed by said at least one first container;

stack means for enclosing said heating means, said at least one first container, said connection means and said at least one second container;

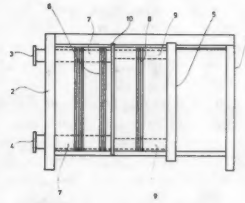
circulating means for passing a heat transfer medium in said at least one second container when hydrogen gas is absorbed by said second hydride and for passing said heat transfer medium in said at least one first container when hydrogen gas is absorbed by said first hydride, said circulating means causing said heat transfer medium to heat a supply of water;

whereby said at least one second container is subjected to heat exchange with said heat transfer medium when said at least one first container is heated by said heating means and said at least one first container is subjected to heat exchange with said heat transfer medium during periods when said at least one first container is not heated.

4,589,480
PLATE HEAT EXCHANGER

Arthur J. Dahlgren, Lund, Sweden, assignor to Alfa-Laval AB, Tumba, Sweden

PCT No. PCT/SE82/00421, § 371 Date Jul. 29, 1983, § 102(e) Date Jul. 29, 1983, PCT Pub. No. WO83/02157, PCT Pub. Date Jun. 23, 1983
PCT Filed Dec. 9, 1982, Ser. No. 519,764
Claims priority, application Sweden, Dec. 10, 1981, 8107398
Int. Cl.⁴ F28F *3/08, 3/02, 13/00*
U.S. Cl. 165—146 **10 Claims**



1. In a heat exchanger including a frame, a plurality of heat exchange plates mounted in the frame and having substantially the same rectangular shape and size, said plates being disposed in spaced face-to-face relationship and with pairs of adjacent plates sealed to each other to define a series of passages for separate flows of two heat exchanging media therethrough, the corner regions of the plates having openings defining inlet and outlet channels for conducting said media to and from the respective passages, the improvement comprising an inlet connection and an outlet connection for one of said media located at one end of the heat exchanger, said plates being arranged in a first group and a second group, said inlet connection communicating through said inlet channels for said one medium in said first group of plates with said inlet channels for said one medium in the second group of plates, said first and

second groups having their said outlet channels for said one medium in communication with said outlet connection, said openings in the plates of the first group being of a first size for defining said inlet and outlet channels for said one medium, said openings in the plates of the second group being of a second size for defining said inlet and outlet channels for said one medium, said second size being substantially smaller than said first size, said openings in the plates of the second group being located eccentrically relative to the corresponding openings in the plates of the first group, each said eccentrically located opening being displaced toward at least one of the two adjacent plate edges from its location if it were concentric relative to the corresponding openings in the plates of the first group, whereby each plate of the second group has a substantially larger heat exchange area than each plate of the first group.

4,589,481

TUBE HEAT EXCHANGER

Rune Mansson, Uttran, Sweden, assignor to AB Zander & Ingestrom, Stockholm, Sweden

PCT No. PCT/SE83/00262, § 371 Date Feb. 29, 1984, § 102(e) Date Feb. 29, 1984, PCT Pub. No. WO84/00207, PCT Pub. Date Jan. 19, 1984

PCT Filed Jun. 27, 1983, Ser. No. 598,310

Claims priority, application Sweden, Jun. 29, 1982, 8204017

Int. Cl.⁴ F28F *1/06*

U.S. Cl. 165—172 **2 Claims**

1. Heat exchanger comprising a set of tubes having essentially straight and parallel centre lines arranged in defined distances from each other, an inlet chamber for supplying a first medium to the tubes through a first wall that keeps the tubes together at the one end of the set of tubes, an outlet chamber for conveying away the medium from the tubes through a second wall that keeps the tubes together at the other end of the set of tubes, and a space between the tubes that at the ends of the tubes is delimited by mentioned walls for through-flow of a second medium, respective tube along the main part of its length between the walls having a non-round cross-section form with two or more ridges, which extend helically round the centre line of the tube, and the tubes by their ridges keeping each other on the defined distances from each other, characterized in that at least certain of the tubes (**14**) are applied so in the heat exchanger that the distances (A_1,A_2) between the centre lines of two adjacent tubes are less than the sum of the radii of the circles that circumscribe the two tubes, each respective tube having a flattened cross-section form with two ridges extending helically round the centre line (**2**) of the respective tube (**14**) in the same direction for all tubes, the tubes being so arranged that their centre lines form a dividing pattern in the form of squares, the tubes being so arranged in relation to each other that they touch each other with their ridges (at **18**) in cross-section planes through the set of tubes, in which the flattened cross-section forms of the tubes form a pattern in the form of said squares, the flattened cross-section forms touching each other at the ends and constituting sides of the squares.

4,589,482

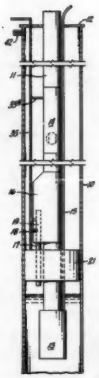
WELL PRODUCTION SYSTEM

Russell I. Bayh, III, Carrollton, Tex., assignor to Otis Engineering Corporation, Dallas, Tex.

Filed Jun. 4, 1984, Ser. No. 617,025

Int. Cl.⁴ E21B *43/12, 34/10*

U.S. Cl. 166—105.5 **3 Claims**



1. A well production system comprising:

a casing;

a tubing within the casing;

a subsurface safety valve controlling flow through the tubing;

a submersible pump in the lower end of the tubing for delivering liquid through said tubing;

a line extending downwardly in the casing-tubing annulus delivering power from the surface to the pump;

a side pocket mandrel in the tubing having a valve pocket;

side port means in said valve pocket angled upwardly and outwardly;

a tailpipe extending downwardly from said side pocket alongside and substantially parallel throughout its length with the axis of said tubing;

a packer carried on the tubing between the side pocket mandrel and pump;

said packer sealing between the casing and each of said power line, tubing and tailpipe;

retrievable valve means in said valve pocket controlling flow between said side port and said tailpipe;

said valve means having a tubular body with upwardly and outwardly extending flowway means in the side wall thereof and in communication with said port means and the lower end of said body to provide a cooperating path for gas flow and for passage of sound waves;

said valve means provided with a valve seat and valve member below said flowway means providing when open sufficient unobstructed opening to permit ready passage of sound waves therethrough; and

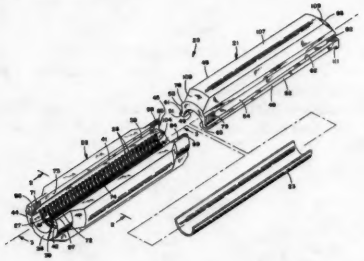
means for opening and closing said subsurface safety valve and retrievable valve means.

4,589,483

ROD CENTRALIZER

Donald E. Sable, 4100 Spring Valley Rd., #900, Dallas, Tex. 75240

Filed Nov. 30, 1984, Ser. No. 676,842
Int. Cl.[4] E21B *37/02, 17/046*
U.S. Cl. 166—176 **1 Claim**



1. A well tool mountable on an elongate round rod including: a pair of complementary longitudinal sections having facing longitudinally extending substantially semicircular recesses in which the rod is receivable and a resilient compressible elongate member in said recess of one of said sections, said sections having first co-engageable means for moving the sections toward one another and compressing said compressible member between said one section and a rod extending through said recesses upon longitudinal movement of the other of said sections in one direction relative to said one of said sections, said one of said sections having transverse facing stop means for limiting longitudinal movement of said compressible member in said recess of said one of said sections, said sections having second co-engageable locking means for holding said other of said sections against longitudinal movement in a second direction opposite said one direction relative to said one of said sections when said compressible member is in compressed position between said one of said sections and the rod, said one section being provided with a plurality of longitudinally spaced transverse grooves opening to said recess of said one of said sections into which portions of said compressible member may move when said compressible member is compressed between said one of said sections and a rod.

4,589,484

DEPLOYMENT SYSTEM

Brian J. Doherty, Marblehead, and Andrew C. Harvey, Waltham, both of Mass., assignors to Foster-Miller, Inc., Waltham, Mass.

Filed Oct. 11, 1984, Ser. No. 659,633
Int. Cl.[4] E21B *33/127*
U.S. Cl. 166—179 **19 Claims**

1. A deployment system for use in an oil well system or the like comprising

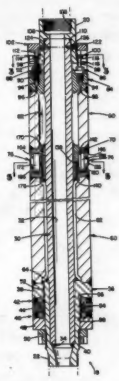
a body for disposition in an elongated tubular casing,

a first chamber in said body containing an incompressible fluid, and

a second chamber in said body containing pressurized compressible fluid,

said system having means for isolating said chambers from one another during a deployment mode while force is being applied by the imcompressible fluid in said first chamber to radially expand said deployable apparatus,

and means for interconnecting said chambers during a maintenance mode to apply the pressure of the compressible fluid in said second chamber to said deployable apparatus to



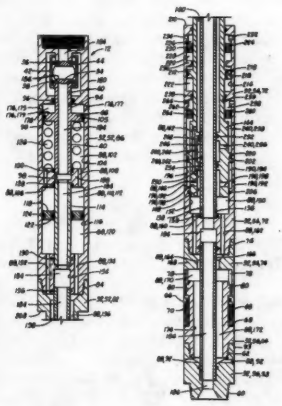
maintain a radially expanded condition of said deployable apparatus.

4,589,485

DOWNHOLE TOOL UTILIZING WELL FLUID COMPRESSION

Gary Q. Wray, Duncan, Okla., assignor to Halliburton Company, Duncan, Okla.

Filed Oct. 31, 1984, Ser. No. 666,699
Int. Cl.[4] E21B *47/00, 33/10, 34/08*
U.S. Cl. 166—250 **19 Claims**



15. A method of operating a downhole tool string, said method comprising the steps of:

(a) providing in said tool string an operating element, a power piston operatively associated with said operating element, and upper and lower longitudinally spaced packer means;

(b) lowering said tool string into a well bore;

(c) sealing said upper and lower packer means between said tool string and said well bore, and thereby defining a sealed well annulus zone between said upper and lower packer means;

(d) communicating a lower pressure side of said power piston means with said sealed well annulus zone through a compression passage;

(e) applying an actuating pressure to a high pressure side of said power piston means;
(f) moving said power piston means in response to a difference between said actuating pressure and well fluid pressure within said sealed well annulus zone, and thereby operating said operating element;
(g) compressing well fluid within said sealed well annulus zone as said power piston means is moved to operate said operating element and thereby storing in fluid compression a portion of the energy applied to move said power piston means;
(h) subsequently decreasing a pressure applied to said high pressure side of said power piston means; and
(i) expanding said compressed well fluid in said sealed well annulus zone, and thereby returning said power piston to an original position thereof.

4,589,486

CARBON DIOXIDE FLOODING WITH A PREMIXED TRANSITION ZONE OF CARBON DIOXIDE AND CRUDE OIL COMPONENTS

Alfred Brown; Stewart Haynes; Gerald W. Alves, all of Houston, Tex., and Frank H. Lim, Aurora, Colo., assignors to Texaco Inc., White Plains, N.Y.

Filed May 1, 1984, Ser. No. 605,756
Int. Cl.[4] E21B *43/16*
U.S. Cl. 166—252 **13 Claims**

1. A process for recovering hydrocarbons from an underground formation, comprising the steps of:
(a) determining the critical concentrations of crude oil components to carbon dioxide to achieve first contact miscibility of a mixture of said crude oil components and said carbon dioxide with the underground hydrocarbons at formation temperature and a selected pressure substantially lower than the pressure needed for first contact miscibility of carbon dioxide with said hydrocarbons;
(b) injecting into the formation a premixed transition zone slug comprising carbon dioxide and said crude oil components at said critical concentrations, formation temperature and said selected pressure, said premixed slug injected in a volume sufficient to form a transition zone between the underground hydrocarbons and a drive fluid injected after the premixed transition zone slug; and
(c) injecting a drive fluid into the formation.

4,589,487

VISCOUS OIL RECOVERY

Valadi N. Venkatesan, Arlington, and Paul B. Venuto, Dallas, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 337,353, Jan. 6, 1982, abandoned. This application Aug. 20, 1984, Ser. No. 642,029
Int. Cl.[4] E21B *43/22, 43/24, 43/243*
U.S. Cl. 166—261 **29 Claims**

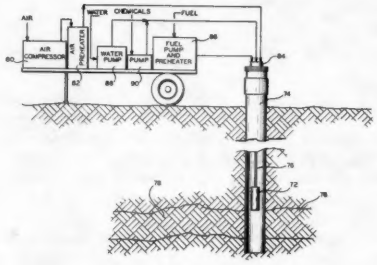
1. A method for recovering oil having the gravity of not greater than about 35° API from a subterranean, viscous oil-containing formation penetrated by at least one injection well and at least one spaced-apart production well, both of said injection and production wells being in fluid communication with a substantial portion of the formation, consisting essentially of the following steps in the recited order:
(a) establishing fluid communication between the injection well and the production well;
(b) injecting into the formation through the injection well at least 0.20 pore volume of an aqueous solution containing at least 1.0% by weight of at least one water-soluble, inorganic salt of carbonic acid to form a complex with the oil, thereby increasing the mobility of the oil, said injecting being conducted for a sufficient time to provide the residence time of the solution in the formation of about 2 to 10 days;
(c) initiating an oil drive process in the formation through the injection well; and
(d) recovering oil from the formation through the production well.

4,589,488

METHOD FOR RECOVERY OF MINERAL RESOURCES

Robert M. Schirmer, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Continuation-in-part of Ser. No. 363,737, Mar. 30, 1982, abandoned. This application Jun. 21, 1983, Ser. No. 506,186
Int. Cl.[4] E21B *43/22, 43/24, 43/28*
U.S. Cl. 166—270 **22 Claims**



1. A method for the recovery of fossilized organic substances from solid materials containing such fossilized organic substances comprising:
(a) burning a hydrogen-containing fuel in the presence of an oxidizing agent in at least one burning step and under conditions sufficient to produce at least one effluent containing significant amounts of partial oxidation products, including significant amounts of alcohols and at least one material selected from the group consisting of hydrogen peroxide, aldehydes and ketones;
(b) terminating said burning step to prevent significant decomposition of the thus produced partial oxidation products and the formation of products of complete combustion therefrom; and
(c) contacting said solid materials containing said fossilized organic substances with said effluent and an alkaline material.

4,589,489

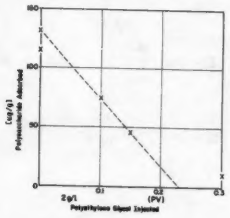
PROCESS FOR RECOVERING OIL FROM SUBTERRANEAN FORMATIONS

Hartwig Volz, Westcellertorstrasse 15a, D-3100 Celle, and Frank-Michael Schnepel, Solferino-Weg 20 (144), D-7000 Stuttgart 80, both of Fed. Rep. of Germany

Continuation-in-part of Ser. No. 478,020, Mar. 23, 1983, abandoned. This application Nov. 19, 1984, Ser. No. 672,543
Int. Cl.[4] E21B *43/16*
U.S. Cl. 166—274 **8 Claims**

1. A process for reducing the loss of relatively high molecular weight polymers to a subterranean formation containing high salinity connate water during an enhanced oil recovery operation in a formation penetrated by at least one injection well and at least one production well, which comprises:
injecting into the formation a sacrificial agent in solution selected from the group consisting of polyethylene glycol, polypropylene glycol, a mixture of polyethylene glycol and

polypropylene glycol, and ethylene oxide/propylene oxide copolymer;



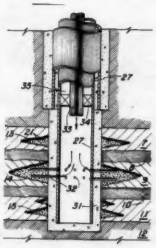
said sacrificial agent having an average molecular weight between about 600 and about 1200.

4,589,490

WELL BORE RECOMPLETION

Carey D. K. Darr, and Eric K. Brown, both of Hobbs, N. Mex., assignors to Conoco Inc., Ponca City, Okla.

Filed Nov. 8, 1984, Ser. No. 669,418
Int. Cl.[4] E21B *43/04*
U.S. Cl. 166—276 **5 Claims**



1. A process for recompleting a well bore having an open hole interval and having zonal breakdown in the locus of the well bore and the open hole interval to reconstitute isolation of a permeable zone from other permeable zones in a subterranean formation comprising:

(a) packing off the open hole interval including the permeable zone to be isolated,

(b) emplacing a particulate material in the packed off interval and the broken down zone,

(c) adhering the particulates of the particulate material together with an adhesive to consolidate the particulates and to form a permable synthetic rock-like solid material,

(d) removing material from along the open hole interval by reaming out to a greater diameter than the original completion so as to leave permeable synthetic rock-like solid material in the broken down zone but not horizontally adjacent to a non-permeable isolation zone which is situated vertically adjacent to the permeable zone to be isolated and which hroizontally abuts the reamed out hole,

(e) setting a smaller diameter casing over the open hole interval,

(f) cementing between the smaller diameter casing and the reamed out hole of (d), and

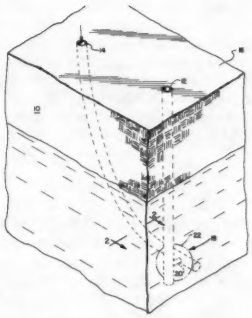
(g) perforating to the permeable zone to be isolated to effect fluid communication between the well and the permeable zone to be isolated.

4,589,491

COLD FLUID ENHANCEMENT OF HYDRAULIC FRACTURE WELL LINKAGE

Thomas P. Perkins, Dallas, Tex., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Continuation of Ser. No. 643,764, Aug. 24, 1984, abandoned, which is a continuation of Ser. No. 425,342, Sep. 28, 1982, abandoned. This application Jun. 27, 1985, Ser. No. 749,137
The portion of the term of this patent subsequent to Oct. 16, 2001, has been disclaimed.
Int. Cl.[4] E21B *43/26*
U.S. Cl. 166—302 **1 Claim**



1. A method of lowering the fracturing pressure of an earth formation portion lying between two boreholes comprising:

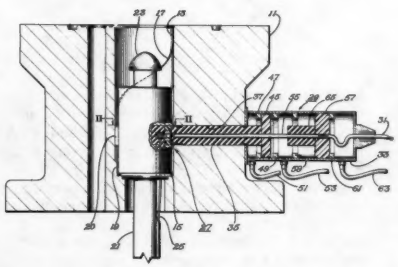
before initiation of a fracture in the earth formation portion, pumping a cooling fluid down a first of said two boreholes at a pressure below formation fracturing pressure, through said earth formation portion and into a second of said two boreholes for a time sufficient to lower the temperature of said formation portion lying between said two boreholes.

4,589,492

SUBSEA WELL SUBMERSIBLE PUMP INSTALLATION

Tom D. Greiner, Vinita; Raymond L. Guzy, Tulsa, and Dick L. Knox, Claremore, all of Okla., assignors to Hughes Tool Company, Houston, Tex.

Filed Oct. 10, 1984, Ser. No. 659,489
Int. Cl.[4] E21B *33/035, 43/01*
U.S. Cl. 166—338 **8 Claims**



1. In a subsea wellhead assembly having a tubular member, suspension head means for locating in the tubular member and suspending a submersible pump, an improved connection means for making an electrical connection from an external cable to an internal cable extending from the pump to the suspension head means, comprising in combination:

an inner insulator carried by the suspension head means;

an electrical connector sleeve connected to the internal cable and carried in the inner insulator;

a resilient, outer insulator movably carried in a passage extending laterally through a wall of the tubular member, and having a sealing face facing inwardly, the outer insulator having a passage therethrough that terminates in a slit at the sealing face;

an electrical connector rod movably carried in the passage of the outer insulator and connected to the external cable, the connector rod being movable relative to the sealing face between a recessed position with its tip recessed within the outer insulator with the slit being closed to prevent the entry of sea water to a protruding position protruding through the slit past the sealing face for entering the connector sleeve; and

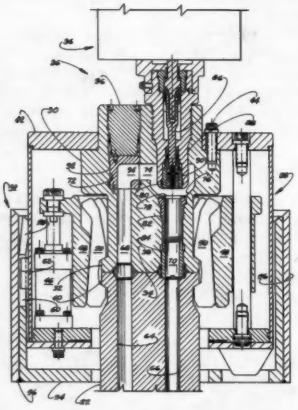
hydraulic piston means for moving the outer insulator relative to the tubular member into engagement with the suspension head means while the connector rod remains in the recessed position, then for moving the connector rod relative to the tubular member from the recessed position to the protruding position into electrical engagement with the connector sleeve while the outer insulator remains stationary.

4,589,493

SUBSEA WELLHEAD PRODUCTION APPARATUS WITH A RETRIEVABLE SUBSEA CHOKE

Thomas P. Kelly, and Edmund A. Fisher, both of Houston, Tex., assignors to Cameron Iron Works, Inc., Houston, Tex.

Filed Apr. 2, 1984, Ser. No. 596,068
Int. Cl.[4] E21B *43/01*
U.S. Cl. 166—341 **7 Claims**



1. A subsea wellhead production apparatus comprising

a subsea production flowline body having first and second passages opening on a surface of said body and means surrounding said body surface for coacting with a connecting means,

a choke body having an inlet and an outlet extending therein from one of its surfaces and means surrounding said surface for coacting with a connecting means,

means in said choke body for conducting flow from said inlet through a valve seat to said outlet,

a valve member movably mounted in said body to coact with said valve seat to control flow through said valve seat,

means for moving said valve member with respect to said valve seat, and

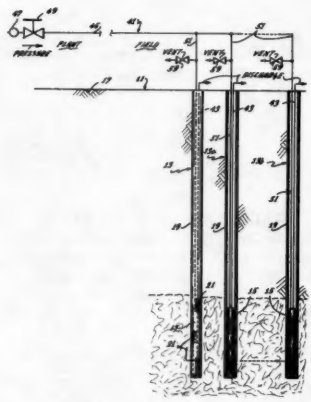
remotely actuated means for releasably connecting said coacting means of said choke body to said coacting means of said flowline body with said first passage in communication with said inlet and said second passage in communication with said outlet whereby flow from said first passage to said second passage is controlled by said valve member.

4,589,494

METHOD OF CONTROLLING THE REMOVAL OF FLOWABLE MATERIAL FROM A WELL

Lester M. Sakoda, Los Angeles, Calif., assignor to Getty Synthetic Fuels, Inc., Signal Hill, Calif.

Filed May 23, 1984, Ser. No. 613,866
Int. Cl.[4] E21B *43/12, 43/18*
U.S. Cl. 166—372 **10 Claims**



1. A method of controlling the removal of flowable material from a well comprising:

providing a pump in the well with the pump including a housing, at least one aperture in the housing leading to an interior chamber within the housing whereby flowable material from the well can enter the chamber and a valve responsive to gas under pressure to close the aperture and force flowable material from the chamber out of the pump and to a reduction in such pressure to allow the valve to open to allow flowable material from the well to enter the chamber through the aperture;

supplying a gas under pressure through a conduit to the pump to close the valve to terminate entry of the flowable material into the chamber and to force the flowable material from the chamber out of the pump;

terminating the flow of gas under pressure through the conduit to the pump; and

continuously venting gas from the conduit during the time that gas under pressure is being supplied through the conduit to the pump and following said step of terminating to bleed gas under pressure from the conduit and the pump to allow flowable material from the well to again enter the chamber.

4,589,495

APPARATUS AND METHOD FOR INSERTING FLOW CONTROL MEANS INTO A WELL CASING

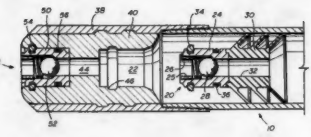
Friedrich H. Langer, and William D. Stringfellow, both of Houston, Tex., assignors to Weatherford U.S., Inc., Houston, Tex.

Filed Apr. 19, 1984, Ser. No. 601,938
Int. Cl.[4] E21B *23/02, 33/16, 34/06*
U.S. Cl. 166—383 **18 Claims**

3. A method for inserting flow control means into a well casing during cementing operations comprising the steps of:

releasably securing a check valve into a check valve housing, said check valve housing having portions forming a

first passageway through said check valve housing into which said check valve may be releasably secured;
mounting a receptacle within a receptacle housing, said receptacle having portions forming a second passageway through said receptacle, said receptacle adapted to receive said check valve housing within said second passageway;
mounting said receptacle housing containing said receptacle within said well casing;
inserting said check valve housing containing said check valve into said receptacle; and
placing said well casing containing said receptacle housing, said receptacle, said check valve housing and said check valve into a well.



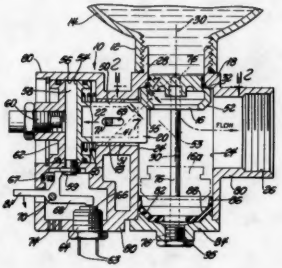
10. An apparatus for inserting flow control means into a well casing in a well during cementing operations comprising:
check valve means adapted to be positioned within said casing to permit fluid flow down the well and to block fluid flow up the well;
choke valve means adapted to be positioned within said casing below said check valve means to restrict fluid flow; and
receptacle means mounted within said well casing, said receptacle means adapted to receive said choke valve means and said check valve means.

4,589,496

FIRE SUPPRESSANT VALVE USING A FLOATING POPPET

Edward J. Rozniecki, 31041 Angeline, St. Clair Shores, Mich. 48082

Filed Apr. 30, 1984, Ser. No. 605,035
Int. Cl.[4] A62C *37/06*; F16K *31/66*
U.S. Cl. 169—20 **2 Claims**



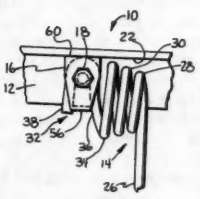
1. In a fire suppressant system comprising a bottle having an exit port, pressurized fire extinguishant within the bottle, and a valve mechanism for controlling extinguishant flow out of the bottle through the exit port: wherein the improvement comprises a valve seat means defining a cylindrical centering surface; a flat stop surface; a floating valve poppet having a cylindrical pilot portion slidable into the cylindrical centering surface, and an outwardly radiating abutment surface engageable with the stop surface to limit motion of the poppet toward the bottle;
a first elastomeric sealing element carried by the pilot portion of the valve poppet for engagement with the cylindrical centering surface, and a second elastomeric sealing element carried by the abutment surface for engagement with a portion of the flat stop surface; said poppet engaging the seat means to prevent flow through the exit port, said poppet being slidably mounted for movement directly away from the seat means to permit the pressurized extinguishant to flow through the port; ledge means comprising a ledge surface that is engaged with the poppet at an acute angle to the plane of the flat stop surface, whereby the ledge means normally biases the poppet into tight engagement with the valve seat means; a piston means movable transverse to the line of motion of the poppet to withdraw the ledge means from its normal position engaged with the poppet; means for operating the piston, said piston-operating means comprising a closed cylinder slidably supporting the piston, a pressurized gas within the cylinder normally biasing the piston in a direction wherein the ledge means supports the poppet in its closed position, and means for venting pressurized gas from the closed cylinder whereby the piston then moves in a direction to draw the ledge means away from the poppet; means limiting movement of the valve poppet in a direction away from the valve seat means; said movement limiting means including a resilient cup-shaped member arranged with its concavity facing the valve poppet; the mouth of the cup-shaped member having a diameter slightly larger than the valve poppet diameter; the internal diameter of the cup-shaped member tapering slightly when measured from the mouth, whereby the resilient side wall of the cup-shaped member tends to grip the side surface of the poppet and thereby minimize the tendency of the poppet to rebound out of the cup-shaped member; and a detent mechanism arranged in the path of the valve poppet to limit rebound motion thereof; said detent mechanism being deflectable by the valve poppet to permit motion thereof away from the valve seat means but thereafter being automatically movable to a position obstructing rebound motion of the poppet toward the valve seat means.

4,589,497

SPRING TOOTH HARROW, AND SPRING TOOTH AND TOOTH CLIP FOR A HARROW

Jack J. Kovar, 1329 - 3rd Ave., S., Anoka, Minn. 55303

Filed May 14, 1984, Ser. No. 610,200
Int. Cl.[4] A01B *23/02*
U.S. Cl. 172—707 **24 Claims**



1. A spring tooth harrow, comprising
(a) a planar flange with an aperture therethrough, said flange being an integral portion of the frame of a harrow;
(b) a harrow tooth having
(1) a suspended tine on one end,
(2) an intermediate spring coil, and on the other end,
(3) a cantilevered generally U-shaped mounting lug having a first side compressed against the frame flange;
(c) a tooth attachment clip having an L-shape with
(1) a first leg facing the frame flange and being compressed upon a second side of the U-shaped lug, and
(2) a second leg at a generally right angle to the first leg, said second leg extending in between and through an inboard leg and a cantilevered outboard leg of the U-shaped mounting lug;

(d) fastening means extending through said flange aperture, between the inboard and outboard legs, and through the clip first leg, for compressively mounting the tooth U-shaped lug between the flange and the clip with said lug being fixed both fore and aft and transversely with respect to the harrow frame; and

(e) in which the planar flange is the first flange of an L-shaped section, the first clip leg having a rear shoulder abutting against a second flange of the section, the second clip leg having an inner surface extending out onto and abutting against an outer lip of the first flange, said tooth being transversely located and fixed jointly by the fastening means and said second leg.

4,589,498

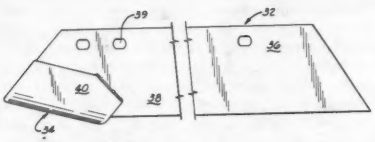
PLOW SHARE OVERCAP

Halsey J. Wetmore, Guymon, Okla., assignor to Adams Hard-Facing Company, Inc., Guymon, Okla.

Division of Ser. No. 433,715, Oct. 12, 1982, Pat. No. 4,529,042, which is a continuation-in-part of Ser. No. 269,406, May 29, 1981, Pat. No. 4,363,364. This application Feb. 25, 1985, Ser. No. 705,199

Int. Cl.[4] A01B *23/00, 39/22*

U.S. Cl. 172—719 **1 Claim**



1. A tillage tool comprising:

a plow share adapted for connection to the frame of a tillage implement and having a top surface, a bottom surface and a leading edge;

a plow point bar-overcap mounted on said plow share and including:

an overcap on said top surface, said overcap defining a major principle plane; and

a leading edge lip projecting downwardly and slightly outwardly from said overcap, and overhanging the plow share adjacent the leading edge thereof, said leading edge lip projecting to a location below the bottom surface of said plow share, and said leading edge lip including an inner surface adjacent said plow share leading edge and inclining away from said plow share leading edge to define a wedge shaped weld metal-receiving gap therewith; and

weld metal positioned in said gap between said lip inner surface and plow share leading edge to join said plow point bar-overcap to said plow share at a location where said weld metal is protected by said leading edge lip.

4,589,499

HORIZONTAL DRILLING APPARATUS

Robert N. Behrens, 4802 W. Laurel La., Glendale, Ariz. 85304

Filed Jul. 30, 1984, Ser. No. 636,132

Int. Cl.[4] E21B *7/02*

U.S. Cl. 173—22 **15 Claims**

1. Horizontal drilling apparatus comprising, in combination:

frame means for supporting a drill, including

a first frame member,

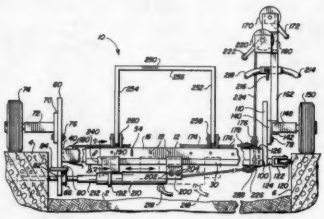
a second frame member movable relative to the first frame member to vary the length of the frame means;

a single wheel secured to the frame means and movable relative to the frame means vertically upwardly and downwardly;

a pair of wheels secured to the frame means remote from the single wheel and movable relative to the frame means vertically upwardly and downwardly;

drill means, including a drill disposed beneath the frame means, movable on the frame means for drilling beneath the single wheel;

thrust means secured to the frmae means adjacent to the pair of wheels for providing longitudinal stability while the drill means is drilling, including



a bracket, and

a wheel secured to the bracket and rotatable in the horizontal plane; and

winch means secured to the frame means, including

first winch means connected to the drill means for moving the drill for drilling beneath the single wheel, and

second winch means connected to the drill means for withdrawing the drill from drilling beneath the single wheel.

4,589,500

TOOL FOR DRIVING IN AND GUIDING PEGS FOR FIXING STAKES

Paul Moraly, 168, 170 rue Victor-Hugo, 93110 Rosny Sous Bois, France

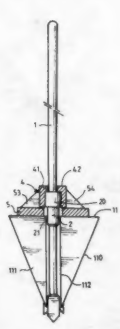
PCT No. PCT/FR83/00103, § 371 Date Feb. 3, 1984, § 102(e) Date Feb. 3, 1984, PCT Pub. No. WO83/04424, PCT Pub. Date Dec. 22, 1983

PCT Filed May 31, 1983, Ser. No. 588,872

Claims priority, application France, Jun. 8, 1982, 82 09943

Int. Cl.[4] B25D *9/00*

U.S. Cl. 173—90 **5 Claims**



1. In combination:

i—a peg for fixing posts and stakes in the ground, said peg comprising a rigid member including at least two assembled metal plates which define an elongate central sleeve adapted to receive a base portion of said post or stake and form projecting fins, said projecting fins having an upper edge surface; and

ii—a tool for driving said peg into the earth, said tool comprising a rigid elongate body having a lower part which has, at least on a portion of the length thereof, a cross-section which substantially matches the cross-section of said

central sleeve for insertion of said lower part into said central sleeve, an upper part and a projecting central part and means, cooperating with said upper part, for imparting axially directed blows on said projecting central part, said projecting central part comprising: an upper portion of enlarged cross-section and a lower portion with a reduced cross-section substantially matching the cross-section of said central sleeve; a bell-shaped member capping the said upper portion and having a base and an upper surface portion which is provided with a central passage for the said upper part and forms a striking surface for said means; and a transverse flat member having a central aperture forming a passage for the said lower portion of the projecting central part, said flat member having an upper surface which is assembled with the base of the bell-shaped member and a lower transverse surface which is adapted for bearing on the upper edge surface of the projecting fins of the peg and is located at a distance from the end of said lower part at least equalling the length of the sleeve of the peg.

4,589,501

OFFSET DRIVER ACCESSORY

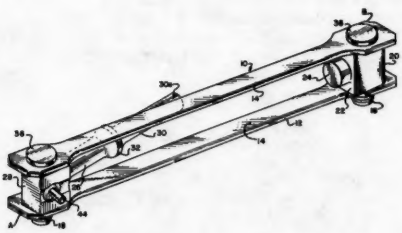
Satya P. Arya, San Jose, Calif., assignor to Ingersoll-Rand, Woodcliff Lake, N.J.

Continuation of Ser. No. 358,864, Mar. 17, 1982, Pat. No. 4,530,409, which is a continuation-in-part of Ser. No. 84,668, Oct. 15, 1979, Pat. No. 4,327,806. This application May 21, 1984, Ser. No. 596,638

The portion of the term of this patent subsequent to May 4, 1999, has been disclaimed.

Int. Cl.[4] B25D *17/00*

U.S. Cl. 173—131 **4 Claims**



1. An offset driver accessory, for inserting friction rock stabilizers in earth bores, comprising:

rigid, elongate bars of a given length, and of substantially straight configurations from end to end thereof;

first means, having a directly-engaged mechanical connection with said bars, adjacent to one end of each, for engaging an end of a friction rock stabilizer; and

second means, also having a directly-engaged mechanical connection with said bars, adjacent to the opposite ends thereof, for receiving a friction rock stabilizer insertion tool whereby, upon any insertion forces being addressed to said second means, such forces are directly communicated to said bars and, therethrough, directly to said first means; and wherein

said first means comprises means which defines a land for engaging an end of a friction rock stabilizer;

at least one of said first and second means is pivotably coupled to said bars;

said bars comprise a pair of parallel bars of matching configuration, having apertures formed therein adjacent the opposite ends thereof;

said first and second means comprise a stabilizer-engaging driver, and an insertion tool-engaging driver, respectively; and

said drivers have threaded stub shafts which are pivotably mounted in said apertures; and further including

wear strips coupled to and partly sheathing said bars.

4,589,502

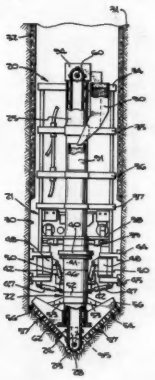
EARTH BORING APPARATUS

Martin de G. Salter, and John G. S. Hynd, both of Tucson, Ariz., assignors to Cementation Company of America, Incorporated, Tucson, Ariz.

Filed May 4, 1984, Ser. No. 607,166

Int. Cl.[4] E21D *1/06*

U.S. Cl. 175—102 **7 Claims**



1. In an earth boring apparatus adapted to continuously excavate a pilot hole by rotation about two axes while simultaneously continuously excavating a main shaft, by rotation about one of said axes, the combination of:

an elongated frame means;

an elongated column means within said frame means and having a through passageway;

a main cutting head of conical form carried by the lower end of said column means;

first drive means on said frame for continuously rotating about a first axis said column means and said main cutter head at a selected speed;

an endless bucket means extending along said column passageway and having a lower portion extending below said main cutter head;

spaced sprocket means for the lower portion of said endless bucket means and having a hub rotatable about a second axis normal to the first axis and below said main cutting head;

a cutter wheel on said hub between said spaced sprocket means and rotatable with said sprocket means about said second axis and with said column and main head about said first axis;

said cutter wheel having spaced cutter elements projecting therefrom;

said bucket means having buckets spaced a selected distance apart to receive therebetween a cutter element as said cutter wheel rotates and said endless bucket means travels around said sprocket means;

a second drive means for continuously rotating said cutter wheel and said sprocket means about said second axis while said main cutter head and said cutter wheel is continuously rotated by said first drive means about said first axis;

the extension of said column lower portion below said cutter head and the continuous rotation of said cutter wheel and sprocket means about both axes continuously excavating a pilot hole and disposing of cuttings from said cutter wheel

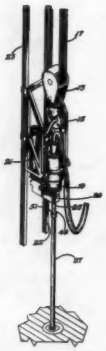
by said bucket means for reception of additional cuttings from said main cutter head and the direct removal of all of said cuttings from said pilot hole directly to the opposite end of said endless bucket means.

4,589,503

TOP DRIVE DRILLING APPARATUS WITH IMPROVED WRENCH ASSEMBLY

Horace A. Johnson, Houston, and Roger Smith, Jr., Georgetown, both of Tex., assignors to Hughes Tool Company, Houston, Tex.

Continuation of Ser. No. 600,939, Apr. 16, 1984, abandoned.
This application Oct. 17, 1985, Ser. No. 788,668
Int. Cl.[4] E21B *19/06*
U.S. Cl. 175—113 **3 Claims**



1. A top drive well drilling apparatus, comprising:
a drive unit for rotating a drill string about the longitudinal axis of the drill string;
a guide track, which extends generally in a vertical direction;
a carriage for connecting and guiding the drive unit along the guide track;
a stem, extending downward from the drive unit, for transmitting torque from the drive unit to the drill string;
a wrench assembly for making and breaking connections between the stem and the drilling string; and
means for moving the wrench assembly between a working position along the stem and a retracted position away from the stem.

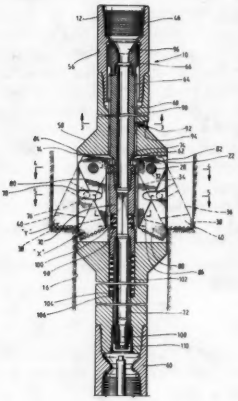
4,589,504

WELL BORE ENLARGER

Neil A. A. Simpson, Aberdeen, Scotland, assignor to Diamant Boart Societe Anonyme, Brussels, Belgium

Filed Jul. 27, 1984, Ser. No. 634,956
Int. Cl.[4] E21B *10/26, 10/32*
U.S. Cl. 175—267 **16 Claims**

1. A hole enlarger for enlarging a well bore comprising:
a tubular housing member having an enlarged section with an outer diameter substantially the same as the diameter of the well bore, the enlarged section having a plurality of longitudinal cut-out portions along its entire length, the cut-out portions defining blades of the enlarged section therebetween, the cutout portion's arc of outer circumference being smaller than the blade's arc of outer circumference to ensure strength and stability of the hole enlarger;
a longitudinal slot within the blade;
a cutting arm mounted to the blade within the slot, the cutting arm having cutting edges and a fluid gallery between the cutting edges, the fluid gallery communicating with the slot and the well bore;
synthetic diamond material attached to the cutting arm; and



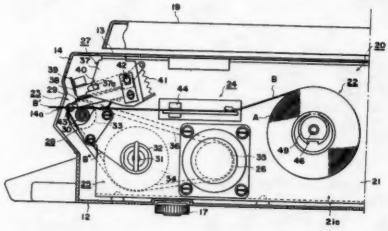
means on the tubular housing member for directing a fluid toward and through the fluid gallery of the cutting arm as the cutting arm enlarges the well bore.

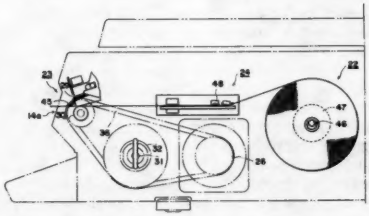
4,589,505

PRINTER WITH TWO PRINTING CAPABILITIES

Naoki Takahashi, Kyoto, Japan, assignor to Kabushiki Kaisha Ishida Koki Seisakusho, Kyoto, Japan

Filed Jun. 18, 1984, Ser. No. 621,385
Claims priority, application Japan, Jun. 18, 1983, 58-93961[U]
Int. Cl.[4] G01G *23/38;* G01D *9/00, 15/28*
U.S. Cl. 177—2 **9 Claims**





3. A printer, accommodated in an electronic balance having an output, provided with a roller support unit for supporting a printing sheet, comprising:
a printing unit, for printing on the printing sheet, including

a printing roller and

a printing head for pressing the printing sheet against said printing roller and impressing on the printing sheet information received from the output of said electronic balance;

a winding unit, having a winding roller provided with a slide clutch for winding the printing sheet after said printing; and

a motor for driving said printing roller and driving said winding roller through said slide clutch.

4,589,506

COMBINATION WEIGHING SYSTEM

Takashi Hirano, Kobe, Japan, assignor to Yamato Scale Company, Ltd., Japan

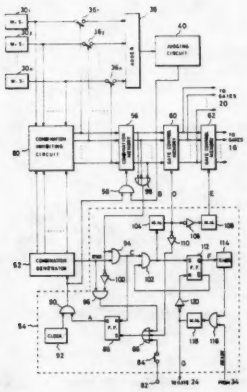
Continuation of Ser. No. 443,959, Nov. 23, 1982, Pat. No. 4,470,166, which is a continuation of Ser. No. 268,696, Jun. 1, 1981, Pat. No. 4,385,671. This application Jun. 11, 1984, Ser. No. 619,493

Claims priority, application Japan, May 30, 1980, 55-73525

The portion of the term of this patent subsequent to May 31, 2000, has been disclaimed.

Int. Cl.[4] G01G *19/22*

U.S. Cl. 177—25 **12 Claims**



1. The method of delivering quantities of product measured by weight with each quantity being of an acceptable weight relative to a reference weight, utilizing a set of weighing devices each adapted to weigh a fraction of said quantity and each adapted for unloading of product therefrom to contribute to a delivery, said method comprising the steps of:

making a combination search to select a combination of said devices to be unloaded to deliver said acceptable weight quantity, said search being made by generating the values of combinations of weights on said devices excluding those devices which were selected in the preceding search and comparing the values with an acceptable weight standard;

unloading the weighing device of the selected combination for said delivery; and

loading the weighing devices which were unloaded;

and wherein the combination search step of generating and comparing the values of the combinations of weights on the weighing devices excluding those devices which were selected in the preceding search is initiated before completion of weighing out new loads on those devices.

4,589,507

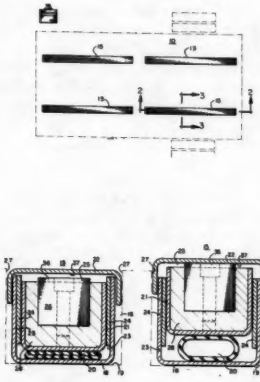
ON BOARD SCALE DEVICES

Barry D. Curran, West Lawn, Pa., assignor to Morgan Corporation, Morgantown, Pa.

Filed Oct. 5, 1984, Ser. No. 658,401

Int. Cl.[4] G01G *19/08, 19/52*

U.S. Cl. 177—138 **6 Claims**



1. In a vehicle for carrying freight items which includes a stationary floor upon which the items are carried, an on board scale device for weighing freight items carried in a recess below the floor of the vehicle which comprises

cover means below said floor adaptable for upward movement for selective contact with said freight items to be weighed,

load responsive means to measure the weight of said freight items,

read out means connected to said load responsive means to indicate the weight of the freight items, and

pneumatic lifting assembly means for selective engagement with said load responsive means for transmittal of the weight of said freight items to said load responsive means.

4,589,508

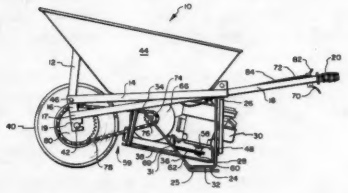
MOTORIZED WHEELBARROW

William A. Hoover, and Fred E. Payne, both of 8791 Blue Jay La., Salt Lake City, Utah 84121

Filed Oct. 5, 1984, Ser. No. 658,115

Int. Cl.[4] B62D *51/04*

U.S. Cl. 180—19.1 **38 Claims**



1. A motorized wheelbarrow comprising:

a frame comprised of a pair of handles, each handle having a leg securely attached thereto positioned so as to aid in supporting said wheelbarrow, means for maintaining said handles securely in place with respect to one another, mounting means attached to said handles and said legs for holding an engine;

a wheel mounted on said frame by connecting means such

that said wheel is in position to bear the load of the frame and its cargo when the handles are lifted;

an engine mounted on said frame;

a friction drive transmission mechanism mounted on said frame such that power produced by said engine is capable of being transmitted to said wheel, said transmission mechanism comprising a friction wheel disposed between a pair of drive plates, said drive plates being in power transmission communication with said wheel, and means for causing said friction wheel to selectively engage one of said drive plates or rest between said drive plates such that the wheelbarrow will be driven selectively in the forward or reverse direction or may rest in neutral; and

a bed pivotably attached to said frame and capable of carrying a load.

4,589,509

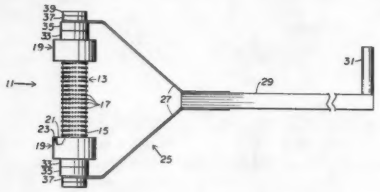
WHEEL PUSHING DEVICE

Phil Chase, 2646 Gilbert Way, Rancho Cordova, Calif. 95670

Filed Oct. 29, 1984, Ser. No. 665,984

Int. Cl.[4] B60D *1/00*

U.S. Cl. 180—74 **10 Claims**



1. A wheel pushing device for use in pushing a wheel on a vehicle which vehicle is resting on a surface, in a forward direction so that said vehicle can be moved from one location on said surface to another location, said wheel pushing device comprising:

a. a driving roller adapted to be placed behind said wheel and be brought into contact with said wheel,

b. a pair of supporting rollers rotably mounted on said driving roller for supporting said driving roller on said surface,

c. a yoke rotably mounted on said driving roller, and

d. spiral clutch means operatively coupled to said yoke, and to said driving roller; and spiral clutch means operatively coupled from said driving roller to said pair of supporting rollers such that rotational movement of said yoke in a first vertical direction will cause counter-clockwise rotation of said pair of supporting rollers and clockwise rotation of said driving roller;

and rotational movement of said yoke in the opposite vertical direction will produce no rotational movement of either of said supporting rollers or said driving roller in either direction,

whereby, rotational movement of said yoke up and down will cause said vehicle to be pushed in said forward direction.

4,589,510

MULTIPLE WHEEL STEERING MECHANISM

Dierk Düerwald, and Jürgen Cittrich, both of Wetter, Fed. Rep. of Germany, assignors to Mannesmann Aktiengesellschaft, Duesseldorf, Fed. Rep. of Germany

Filed Jul. 3, 1984, Ser. No. 627,454

Claims priority, application Fed. Rep. of Germany, Jul. 9, 1983, 3324862

Int. Cl.[4] B62D *5/06*

U.S. Cl. 180—140 **7 Claims**

1. A multiple wheel steering device, there being a front axle for at least one wheel, and a rear axle for at least two wheels, the vehicle having a longitudinal center axis, comprising:

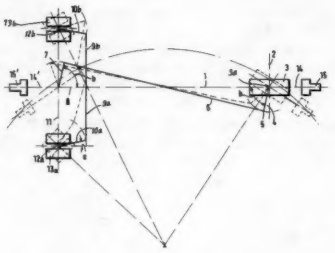
a steering lever operatively connected to the front axle for turning the front wheel or wheels about a vertical axis on and through said center axis, the lever extending to and remaining on one side of said longitudinal center axis;

a first pole extending generally forward from said steering lever;

first signal receiving device on said pole;

an intermediate lever provided for pivot motion about a vertical axis on and through the longitudinal axis of the vehicle and having a lateral lever extension extending to and remaining on a side opposite the side of said first steering lever;

a second pole extensing generally rearward from the intermedaite lever;



a second signal receiving device on said second pole;

a single rod for interconnecting at an oblique angle to the longitudinal center axis, said steering lever and said lateral lever extension;

additional lever means for connecting said intermediate lever to individual journal mounts for said rear wheels for pivoting the mounts individually on vertical axes, upon pivoting of said intermediate lever by operating of said oblique connection;

a steering motor connected to the signal receiving devices and to the front wheels for steering the vehicle on forward and reverse motion, there being no separate steering motion for the rear wheels; and

a front wheel drive connected to the front axle, there being no additional drive for the wheels on the rear axles.

4,589,511

ALL-WHEEL DRIVE AUTOMOTIVE VEHICLE TRACTION CONTROL SYSTEM

Heinz Leiber, Oberriexingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jun. 14, 1984, Ser. No. 620,467

Claims priority, application Fed. Rep. of Germany, Jun. 14, 1983, 3321377

Int. Cl.[4] B60K *17/356*

U.S. Cl. 180—197 **5 Claims**

1. The combination of an all-wheel drive automotive vehicle comprising

an internal combustion engine (**2**);

a transmission (**3**) coupled to the engine;

four wheels, two each at a front axle, and two each at a rear axle;

a front axle differential (**4**) and a front axle drive shaft (**4***a*) coupled to the front axle differential to permit driving the front wheels from the engine via the transmission;

a rear axle differential (**5**) and a rear axle drive shaft (**5***a*) coupled to the rear axle differential to permit driving the rear wheels from the engine via the transmission; and

a coupling differential (**3***a*) coupled to the transmission (**3**) to be driven thereby and connected to the front axle drive shaft as well as to the rear axle drive shaft;

with a traction control system comprising

a brake control unit (**35, 36, 37**) associated with each wheel for, respectively, applying braking control pressure, or relieving braking control pressure from an associated wheel;

including

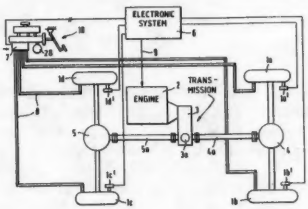
speed sensors (**1a'-1d'**) coupled to the respective wheels and providing individual wheel speed output signals;

a control unit (**6**) connected to receive all the individual wheel speed output signals from all of the speed sensors,

the control unit combining at least two of said wheel speed output signals to develop a reference signal representative of vehicle speed,

said reference signal being formed from at least two wheel speed signals, with time delay with respect to the then pertaining at least two actual wheel speed signals;

automatic brake control means (**7**) coupled to the brake control units (**35, 36, 37**) associated with brakes of the wheels,



said brake control means (**7**) being connected to and controlled by said control unit (**6**) which receives the wheel speed signals to control the brake control unit of at least one wheel which provides a wheel speed output signal which differs substantially from said reference signal, indicative of speed of said at least one wheel which is high with respect to vehicle speed represented by said reference signal,

said brake control means controlling application of the brake associated with said at least one wheel upon sensing spinning of said at least one wheel or of a tendency of said at least one wheel to spin; and

a control connection (**9**) connecting the control unit (**6**) to the engine (**2**) and effecting a change in engine operation in a direction to decrease output torque being transmitted by the engine to the transmission (**3**) and hence to said differentials (**3a, 4, 5**) if the wheel speed signals derived from all the sensors (**1a'-1d'**) indicate a speed of all the wheels representative of spinning of all the wheels.

4,589,512

MOTORCYCLE RADIATOR

Ken Yamaguchi, Saitama, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 7, 1983, Ser. No. 540,422

Claims priority, application Japan, Oct. 7, 1982, 57-152655[U]

Int. Cl.⁴ B60K *11/04*

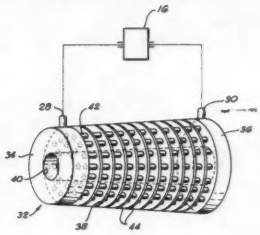
U.S. Cl. 180—229 **1 Claim**

1. A motorcycle having a radiator and an exhaust system extending rearwardly along one side of the motorcycle including a muffler circular in cross section, said radiator comprising

an inlet tank;

an outlet tank; and

a radiator core between said inlet tank and said outlet tank, said core including a plurality of tubes extending in communication between said inlet tank and said outlet tank, said radiator having a shape to simulate the muffler and



positioned on the opposite side of the motorcycle from the muffler.

4,589,513

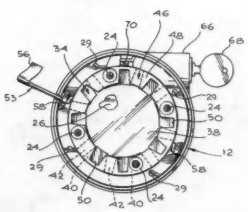
ANTI-THEFT STEERING WHEEL ADAPTER DEVICE

John P. Proffitt, San Dimas, Calif., assignor to Whittar Industries Ltd., Barrington, Ill.

Filed Mar. 20, 1985, Ser. No. 713,952

Int. Cl.⁴ B60R *25/02*

U.S. Cl. 180—287 **7 Claims**



1. An improved adapter device for preventing theft of steering wheels while rendering them removable, said device comprising, in combination:

a. an open topped housing having upraised sides connected to a transverse bottom, said bottom being interconnectable to a vehicle steering column;

b. a biasing plate slideably supported in a horizontal position on a plurality of spaced vertical posts secured in said housing, said biasing plate bearing on the upper surface thereof a plurality of spaced ridges extending upwardly therefrom and arranged at the periphery thereof to define peripheral recesses therebetween;

c. a horizontal ring locking plate fixedly secured to said posts above said biasing plate and bearing spaced teeth defining therebetween a plurality of notches extending vertically therethrough, said teeth partially overlying said recesses and said notches partially overlying said ridges;

d. spring biasing means biasing said biasing plate up against said locking plate;

e. a lever secured to said biasing plate and extending outwardly from said housing for selectively moving said biasing plate downwardly away from said locking plate against said biasing means;

f. a keylock in said housing and extending outwardly therefrom and including means for releasably locking said biasing plate up against said locking plate; and,

g. an inverted cup-shaped steering wheel connector cap securable to the hub of a steering wheel, and bearing on the underside thereof a central cap plate having peripheral projections matching said notches so that said connector cap can be pressed down through said locking plate to

depress said biasing plate sufficiently to permit partial rotation of said cap plate in order to place said projections in said recesses and trap them therein below said teeth, said biasing means preventing the removal of said projections from said recesses until said lever means is rotated to depress said biasing plate when said lock is in the unlocked position.

4,589,514

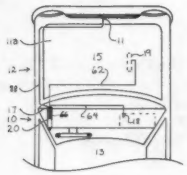
LOCK FOR VEHICLE HOOD RELEASE FOR THEFT PREVENTION

Dennis A. Wilson, McHenry, and Dennis W. Anesi, Rolling Meadows, both of Ill., assignors to Ansan Industries Limited, Chicago, Ill.

Continuation of Ser. No. 507,562, Jun. 24, 1983, abandoned. This application Jul. 24, 1985, Ser. No. 758,286

Int. Cl.[4] B60R *25/04*

U.S. Cl. 180—289 **20 Claims**



1. A hood release lock for preventing theft of a motor vehicle including means for releasably locking the hood release of said motor vehicle and means for releasably disabling a starting mechanism of said motor vehicle wherein said hood release lock comprises:

(a) a housing secured to a frame member on the interior of said motor vehicle; wherein said housing for said hood release lock has a handle chamber for slideably receiving a handle means, a detent chamber to receive a detent assembly, a solenoid chamber to receive a solenoid, and a latch activation chamber to receive a latch release assembly;

(b) a two-piece armored conduit means resistant to cutting or penetration secured to said housing at a cable end of said housing and extending from said housing through a firewall of said vehicle;

(c) a hood release mechanism, an ignition disabling device, and a battery switch connector all being operatively connected within said housing and contained within said armored conduit;

(d) a handle means slideably and lockably mounted within said housing at a handle end of said housing;

(e) said handle means being operatively connected to said hood release mechanism, said ignition disabling device, and said battery switch connector.

4,589,515

EXHAUST TAIL PIPE ARRANGEMENT

Hideo Omura, Yokosuka, Japan, assignor to Nissan Motor Company, Limited, Yokohama, Japan

Filed Dec. 7, 1984, Ser. No. 679,247

Claims priority, application Japan, Feb. 8, 1984, 59-16166[U]

Int. Cl.[4] F01N *7/08*

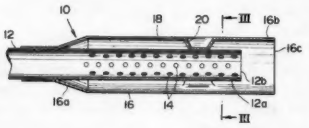
U.S. Cl. 181—227 **9 Claims**

1. An exhaust tail pipe arrangement comprising:

an exhaust tail pipe having an end section through which exhaust gas from an engine is discharged to ambient air;

an outer cover member disposed around said tail pipe end section in a manner to form a space between it and said exhaust tail pipe end section; and

means defining a plurality of perforations in said exhaust tail pipe end section, each perforation establishing communication between the inside of said tail pipe end section and said space, each perforation having a diameter d (mm) within a range expressed by the following formula:



$$d \leqq \frac{4.4}{C} \times 10^3 \frac{A}{D^2}$$

where

A (l)=displacement of the engine;

D (mm)=inner diameter of said exhaust tail pipe end section; and

C=kind of stroke cycle of the engine ("4" for a four-stroke cycle engine; and "2" for a two-stroke cycle engine).

4,589,516

MUFFLER FOR INTERNAL COMBUSTION ENGINES

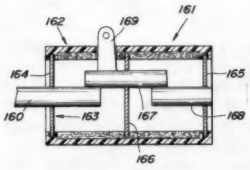
Takeshi Inoue; Hiroyuki Saito; Tomoyuki Takewaka, and Hiroshi Funabashi, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Japan

Filed Feb. 20, 1985, Ser. No. 703,368

Claims priority, application Japan, Feb. 20, 1984, 59-30868

Int. Cl.[4] F01N *1/24*

U.S. Cl. 181—256 **4 Claims**



1. A muffler for an internal combustion engine comprising:

(a) an outer box composed of separated bodies made of a formed sound insulation material and having portions joined by an adhesive, said outer box having an inlet for introducing an exhaust gas from the internal combustion engine and an outlet for discharging the exhaust gas;

(b) a reinforcing member mounted on said joined portions to seal and reinforce the same;

(c) an inner structural member of an iron-based material disposed in said outer box and supporting said outer box;

(d) an exhaust pipe connected to said internal combustion engine and to said inlet;

(e) an attachment stay mounted on said outer box; and

(f) said inner structural member being connected to said attachment stay and to the exhaust pipe.

4,589,517

MUFFLER

Masuo Fukuda, Omiya, Japan, assignor to Saikei Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 2, 1984, Ser. No. 667,719

Claims priority, application Japan, Nov. 30, 1983, 58-185317[U]; Feb. 24, 1984, 59-32635

Int. Cl.[4] F01N *1/10*

U.S. Cl. 181—265 **16 Claims**

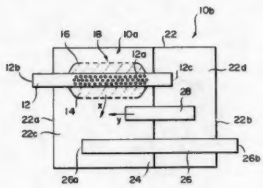
1. A muffler assembly for admitting gases accompanied by noise to dampen the noise, comprising:

a housing member generally cylindrical in shape having interior plates which are substantially perpendicular to the longitudinal axis of said housing member to define a plurality of chambers;

a muffler supported in said housing member, said muffler including:

gas induction means for admitting the gases at one end thereof and discharging a portion of said gases at the other end thereof into a second of said plurality of chambers, said gas induction means having a perforated section;

an air permeable sound absorbing member mounted around at least the perforated section of said gas induction means for allowing the remaining portion of said gas admitted into said gas induction means to be passed through said



perforated section and said air permeable absorbing member to absorb the noise;

a retainer member having communication and non-communication wall sections formed for covering and supporting the outer periphery of said sound absorbing member, said communication section being formed to discharge the remaining portion of the admitted gases into the first of said plurality of chambers;

a pipe connecting said first and second chambers such that gases which have been discharged into the second chamber can pass through said pipe and back into said first chamber to interfere with the gases being discharged from said communication section of the retainer member; and

means communicating with said first chamber for discharging gases from the first chamber to the atmosphere.

4,589,518

REVOLVING BLOCK FOR HIGH PLACE WORKING VEHICLE

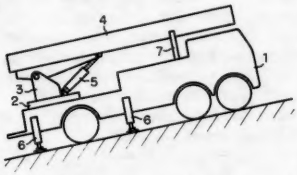
Tetsuo Kohzai; Naoyuki Murai, and Masayoshi Yamasaki, all of Osaka, Japan, assignors to Morita Fire Pump Mfg. Co., Ltd., Osaka, Japan

Filed Aug. 20, 1985, Ser. No. 767,444

Claims priority, application Japan, Aug. 23, 1984, 59-176450; Aug. 23, 1984, 59-176451

Int. Cl.⁴ B66F *11/04*

U.S. Cl. 182—2 **2 Claims**



1. A revolving block for a high place working vehicle, comprising a first wheel fixed on the body of the high place working vehicle at the center of revolution of the vehicle, a second wheel supported for rotation by said first wheel through a first rolling contact bearing, a third wheel supported for rotation by said second wheel through a second rolling contact bearing having an axis obliquely crossing the axis of said first rolling contact bearing, a fourth wheel supported for rotation by said third wheel through a third rolling contact bearing which has an axis obliquely crossing the axis of said second rolling contact bearing and which is positioned parallel to the first rolling contact bearing when not in inclination correcting action, a turntable fixed on said fourth wheel, a device for preventing said turntable from rotating relative to the vehicle body, a first fixing device for fixing said first and second wheels to prevent their relative rotation, a second fixing device for fixing said second and third wheels to prevent their relative rotation, a first driving device for causing relative rotation between said first and second wheels, and a second driving device for causing relative rotation between said turntable and said third wheel.

4,589,519

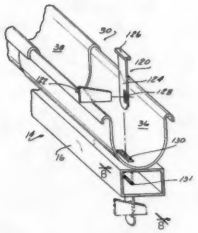
VEHICLE MOUNTED FIRE ESCAPE CHUTE

Danny P. Hunter, 17226 Eddon, Melvindale, Mich. 48122

Continuation-in-part of Ser. No. 610,955, May 16, 1984. This application Oct. 4, 1985, Ser. No. 784,205

Int. Cl.⁴ B64D *25/08*

U.S. Cl. 182—48 **6 Claims**



1. A fire escape chute for use on a vehicle having an extensible boom comprising:

a fire escape chute mounted on the boom, the chute including a plurality of telescoping chute sections, each of the chute sections including opposed side walls, a bottom and an open top; and

means for mounting the chute sections on the boom, the mounting means comprising:

alignable apertures formed in selective chute sections and boom; and

locking means removably insertable through the aligned apertures in the chute and boom for locking selective chute sections to the boom.

4,589,520

PLATFORM SERVICE VEHICLE

David L. Tapfer, P.O. Box 250, 1680 Bellus Rd., Hinckley, Ohio 44233

Filed Jan. 6, 1983, Ser. No. 456,313

Int. Cl.⁴ E04G *1/22*

U.S. Cl. 182—63 **7 Claims**

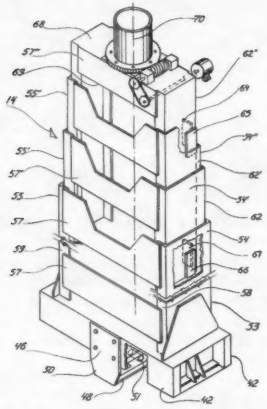
1. In a platform type service truck suitable for use upon and travel along public highways; the truck having a chassis including parallel frame members for supporting truck portions including a cab mounted upon the chassis, an engine and drive train for powering the truck, at least one powered source of hydraulic fluid under pressure for operating hydraulic devices mounted on the truck, and a work platform mounted to the frame members and capable of being telescopingly elevated from a lowered position for transporting the truck along public roadways to at least one elevated working position, the improvement comprising:

a stationary telescopic tower section mounted atop the frame members, the stationary section including two opposing channel-like vertical members joined by at least three cross members, a cross member being positioned closely adjacent each end of the stationary telescopic tower section;

at least one extendible telescopic tower section including opposing channel-like vertical members joined by at least three cross members, a crossmember being positioned closely adjacent each end of the extendible telescopic tower section, the extendible section being slidingly nested within the stationary section, and additional extendible sections being slidingly nested one within the next whereby the stationary section is outermost and an extendible section capable of being more elevated than any other section is innermost within the nest the more elevatable extendible section having a closed upper end forming a support plate and having a king post mounted to the support plate upwardly from the support plate;

elevational stops between each telescoping tower section and the next innermost telescoping tower section positioned to prevent a telescoping tower section from being elevatably withdrawn from the nest, the elevational stops being configured as sliding pads for facilitating sliding between adjacent sections;

a double acting hydraulic cylinder having a barrel including attachment tabs, and a number of telescopic extendible portions, including a most extendible having an attachment point, equalling the number of extendible telescopic



tower sections, each telescopic extendible cylinder portion being attached to a corresponding tower section whereby longitudinal movement of the cylinder portions positively and correspondingly longitudinally moves the nested tower sections, the double acting hydraulic cylinder being affixed by its attachment point adjacent the mounting between frame members and stationary tower section and by its barrel to the support plate obversly from the king post, the cylinder including fluid interconnections to the source of hydraulic fluid;

a platform rotatable in a horizontal plane, including safety rails and a work surface, the platform having an upper base to which the safety rails and work surface are attached, and a lower base, the platform bases being separated by insulators and by spacing with the separation being rated for at least 500 volts, the platform lower base including a circular recess configured to receive the king post snugly, and a ring worm gear affixed to the lower base centerably surrounding the recess;

a platform rotational drive, the rotational drive including a worm drive gear having a hydraulically driven motor affixed to the support plate and engaging the ring worm gear, the engagement being self locking while the drive gear is not under power regardless of rotational position of the platform, and a hydraulically driven motor including fluid interconnections to the source of hydraulic fluid for powering the worm drive gear in either direction; and

at least one set of controls for regulating the flow of hydraulic fluid under pressure separately to the cylinder and the hydraulically driven worm gear drive motor, any controls mounted above the lower platform base being interconnected in a manner preserving the electrical insulative integrity of the platform.

4,589,521

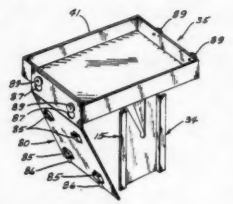
ADJUSTABLE IMPLEMENT HOLDER FOR STEPLADDERS

Emma R. Finster, and Peter W. Finster, both of 217 Glasgow Street, Kitchener, Ontario, Canada (N2M, 2M3)

Continuation-in-part of Ser. No. 697,612, Feb. 4, 1985, Pat. No. 4,550,803. This application Aug. 26, 1985, Ser. No. 769,507

Int. Cl.[4] E06C *7/14*

U.S. Cl. 182—129 **3 Claims**



1. An apparatus for adjustably supporting diverse articles on a stepladder wherein the apparatus comprises:

a base unit including a base member whose outboard edges are adapted to frictionally engage the exterior surface of the stepladder legs;

a support unit rotatably mounted on said base unit comprising:

a support plate having a plurality of tang elements projecting outwardly therefrom, wherein said plurality of tang elements are dimensioned to slidingly receive the said article securing means, at least one of said plurality of tang elements having a floor element that provides a support surface for said article securing means;

an article securing means releasably engaged by said support unit, and adapted to operatively support diverse articles; said article securing means includes:

a flanged plate element having an article support portion thereon, said article support portion including a lipped tray member secured to the top of said flanged plate element, the improvement comprising:

a releasable locking means operatively associated with said base unit, and said support unit for restricting the relative rotation between said base unit and said support unit;

a mounting bracket unit comprising a bracket member, having outwardly projecting arms that are adapted to frictionally engage the interior surface of the stepladder legs, when the bracket member is operatively connected to the base member via suitable fastening means;

support unit means for operably receivably attaching a second article securing means thereto; and

means for removably attaching said support unit means to one side of said lipped tray member.

4,589,522

CHAIR FOR TREE STAND AND THE LIKE

Dennis L. Shelton, 333 El Dorado St., Lakeland, Fla. 33805

Filed Jul. 22, 1985, Ser. No. 757,535

Int. Cl.[4] A01M *31/02;* A47F *3/26;* A47C *9/10*

U.S. Cl. 182—187 **11 Claims**

1. A chair for a tree stand or the like, comprising in combination:

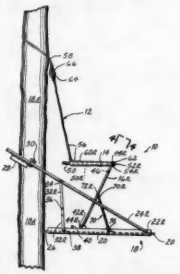
a flexible member defining a back portion and a seat portion, said seat portion including side edges and front edge and said back portion including an upper end;

a substantially U-shaped member including left and right side legs;

means for connecting said side edges of said seat portion of said flexible member to said left and right side legs of said U-shaped member;

left and right chair legs, each having upper ends;

means for pivotably connecting said upper ends of said left



and right chair legs to said left and right side legs of said U-shaped member, respectively;

means for securing said chair legs in a spaced-apart position from one another; and

means for suspending said back portion of said flexible member above said seat portion of said flexible member.

2. The chair as set forth in claim 1, further including means for supporting said chair legs in a substantially upright position.

4,589,523

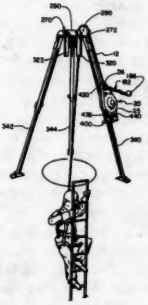
FALL ARRESTER AND EMERGENCY RETRIEVAL APPARATUS AND ANCHOR APPARATUS THEREFOR

Wayne L. Olson, Evergreen, and Billy R. Hensley, Lakewood, both of Colo., assignors to Rose Manufacturing Company, Englewood, Colo.

Filed Feb. 10, 1984, Ser. No. 578,963

Int. Cl.[4] F16D *59/00*; A62B *1/10*

U.S. Cl. 182—234 **31 Claims**



1. A fall arrester and retrieval apparatus comprising:

a. speed sensitive drum means rotatable about a central axis of rotation in a first direction associated with line means extension and a second direction associated with line means retraction, said drum means being biased in said second direction by a biasing torque to prevent slack in associated line means; said drum means being substantially free rotating in said second direction except for said biasing torque; said drum means being substantially free rotating in said first direction except for said biasing torque, up to a predetermined speed; said drum means being adapted to gradually brakingly halt rotation in said first direction at said predetermined rotational speed and being adapted to lock in a non-rotating position subsequent to said braking so long as an externally applied torque in said first direction of rotation is applied to said drum means and so long as said externally applied torque does not exceed a predetermined override value and being adapted to unlock and return to said free rotating state when said externally applied torque in said first direction is removed;

b. line means operably attached at a first end thereof to said drum means for being windingly retracted and unwindingly extended therefrom, said line means being operably attachable at a second end thereof to a worker's safety harness;

c. housing means for rotatably mounting said drum means therein, said housing means being operably attachable to an anchorage;

d. gear means selectively positionable in a disengaged operating mode in disengaged relationship with said drum means and an engaged operating mode in engagement with said drum means for turning and being turned by said drum means when in said engaged operating mode;

e. shaft means, having a longitudinal shaft axis, operably associated with said gear means for turning and being turned by said gear means during said engaged operating mode in a first shaft rotation direction associated with said first direction of rotation of said drum means associated with line means extension and a second shaft rotation direction associated with said second direction of rotation of said drum means associated with line means retraction;

f. drive means operably associated with said shaft means for turning said shaft means and for selectively tightening and loosening a clutch means, said drive means being rotatable in a first drive means direction associated with line means extension and a second drive means direction associated with line means retraction;

g. clutch means operably associated with said shaft means and said drive means for use during said gear means engaged operating mode for selectively causing rotational engagement and disengagement of said drive means with said shaft means wherein rotation of said drive means in said first drive means direction associated with line means extension causes adjustable clutching disengagement of said drive means and said shaft means allowing rotation of said shaft means in said first shaft means direction associated with line means extension in response to a load on said line means, and wherein rotation of said shaft means in said first shaft means direction with said drive means in an immobilized position produces clutching engagement of said shaft means and said drive means whereby rotation of said shaft means is brakingly halted, and wherein initial rotation of said drive means in said second drive means direction associated with line means retraction causes adjustable clutching engagement of said drive means and said shaft means and wherein rotation of said drive means in said second drive means direction subsequent to said clutching engagement causes rotation of said shaft means in said shaft means second direction associated with line means retraction;

h. whereby said fall arrester and retrieval apparatus is operational in a fall arrester state associated with said gear means disengaged operating mode, for arresting the fall of a worker attached to said line means, and

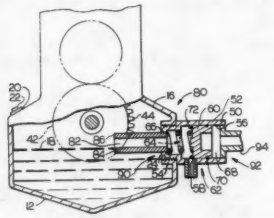
whereby said fall arrester and retrieval apparatus is operational in an emergency retrieval state associated with said gear means engaged operating mode, for raising or lowering a worker to a selected position subsequent to a fall by rotation of said drive means in said second drive means direction to retract the line means to raise the worker and by rotation of said drive means in said second drive means direction to remove the torque load on said drum means to release the locking mechanism of said drum means and to subsequently permit lowering of the worker by rotation of said drive means in said first drive means direction to cause said clutch means to adjustably disengage said drive means and said shaft means to allow controlled descent of the worker by controlled rotation of said drum means in said first drum means direction.

4,589,524

OVERFILL VALVE

John E. Laycock, San Diego, Calif., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Jul. 9, 1985, Ser. No. 753,201
Int. Cl.[4] F01M 11/12
U.S. Cl. 184—103.1 2 Claims



1. An engine having an operating and a non operating mode and including a reservoir containing a liquid to be maintained at a predetermined level irrespective of a sloping attitude the engine and reservoir may be at, comprising:

means for forming a vent passage from the reservoir,

a valve attached to the reservoir and movable between an open position at which liquid in excess of the predetermined level is vented through the vent passage and a closed position at which communication through the vent passage is blocked,

said means forming said vent passage including a tube having a first end extending into the reservoir to a position approximately centered therein and at the predetermined level of the liquid and a second end connected to said valve, to thereby ensure that the predetermined level in the reservoir is maintained,

said valve including a body having a first bore and a second bore intersecting the first bore, said vent passage communicating with the first bore, and a spool slideably positioned within the first bore and movable between the open position in which the vent passage is in communication with the second bore and the closed position in which the vent passage is blocked from communication with the second bore,

said valve including a chamber in the first bore at one end of the spool,

a single spring means for moving the valve to the open position when the engine is in the non operative mode, said single spring means positioned in the first bore at the other end of the spool,

means for moving the valve to the closed position in response to the engine being in the operating mode,

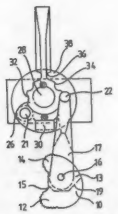
said means for moving the valve to the closed position including a conduit communicating between a pressure producing means driven by the engine in the operating mode and the chamber in the first bore at said one end of the spool, said pressure acting upon said valve to cause said valve to move against said single spring means while said valve simultaneously blocks said vent passage to thereby establish an engine reservoir that may be supplied with liquid in any amount during the non operating mode without the risk of overfilling the reservoir while assuring that irrespective of the position of the engine and the slope of the liquid level with respect to the horizontal, said liquid level is always uniformly controlled as a consequence of said vent passage tube first end position in said reservoir when the engine is non operative, whereas the moment said engine enters the operative mode liquid is prevented from passing through said vent passage.

4,589,525

BRAKING APPARATUS

Warren W. Phipps, 467 College Street; Richard C. E. Kee, 16 Clarke Avenue, and T. Paul Mather, 27 Shamrock Street, all of Palmerston North, New Zealand

Filed May 15, 1984, Ser. No. 610,600
Claims priority, application New Zealand, May 16, 1983, 204245
Int. Cl.[4] B60T 1/00
U.S. Cl. 188—2 F 10 Claims



1. A braking apparatus for use with a tire having a resilient rolling surface, the tire being rotatably mounted on a frame, comprising:

a main body member mounted on the frame;

a first lever arm pivotally mounted on said main body member;

a pin member mounted on and extending from said first lever arm adjacent one end thereof;

a first cam pivotably mounted on said first lever arm adjacent the other end thereof;

two tire engaging braking lobes on said first cam;

means to limit the pivotal movement of said first cam to an arc of predetermined length relative to said first lever arm;

a second cam pivotally mounted on said main body member having a curved camming surface;

two indents on said camming surface in a position with respect to said first lever arm to selectively receive said pin member therein, one of said indents having a greater depth than the other indent relative to said camming surface; and

biasing means operatively disposed between said main body member and said first lever arm for biasing said first lever arm about its pivot axis in the direction in which said pin member is urged into engagement in one of said indents;

so that when said pin member is engaged in said indent having a greater depth than the other indent said first lever arm is in an inoperative position wherein said lobes of said first cam are disengaged from the tire surface to allow the tire to rotate freely, and when said pin member is engaged in the other indent said first lever arm is in an operative position wherein said cam lobes are engageable with the tire surface and said first cam is pivoted aobut its pivot axis to urge one of said cam lobes to apply braking pressure to the tire when the tire is rotating in a first direction and to urge the other of said cam lobes to apply braking pressure to the tire when the tire is rotating in a second direction opposite to said first direction.

4,589,526

CONTROLLABLE FLUID DAMPER FOR FLUID-CONTAINING TANK

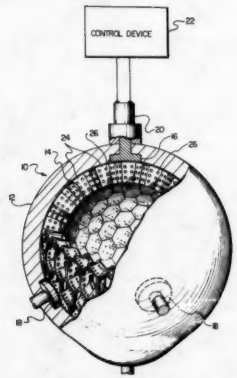
Yi M. Chang, Woodland Hills, and James R. Fenwick, Chatsworth, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Jun. 11, 1984, Ser. No. 619,081
Int. Cl.[4] F16D 49/00
U.S. Cl. 188—74 5 Claims

1. A controllable fluid damper for a fluid-containing spherical tank having a circular section of wall therein comprising:

a hollow sphere having a wall an outer surface of which lies adjacent to an inner surface of the circular section of the tank wall,

the wall of the sphere being formed with holes therethrough both radially and in non-radial directions for imparting a dampening effect on fluids passing therethrough;



said sphere being free to rotate in any direction within said spherical tank in response to rotational fluid motion within said tank; and

braking means, separate and apart from any braking forces imposed on said sphere by said fluid, for halting the rotational motion of said sphere and dampening rotational motion of said fluid when such is desired.

4,589,527

AUTOMATIC ADJUSTING DEVICE FOR A BRAKE

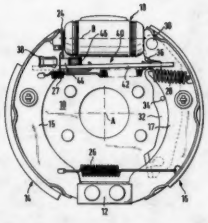
Ulrich W. Danne, Bendorf-Sayn, and Helmut Heibel, Moschheim, both of Fed. Rep. of Germany, assignors to Lucas Industries public limited company, Birmingham, England

Filed Nov. 29, 1983, Ser. No. 555,968

Claims priority, application Fed. Rep. of Germany, Dec. 3, 1982, 3244872

Int. Cl.⁴ F16D *65/56*

U.S. Cl. 188—79.5 GE **6 Claims**



1. An automatic adjusting device for a brake, in particular a motor vehicle brake comprising a strut, whose effective length depends on the relative positions of two strut portions adjustable with respect to each other, said strut being connected in parallel with a brake actuating mechanism, one of said strut portions having at least one part transversely movable and adjustable transversely with respect to the longitudinal axis of the strut and having a camming means engaging with the other strut portion and which, upon actuating of the brake by an actuating force, tends to increase the length of the strut, said part having an operative connection with an intermediate member which is disposed between two structural members transmitting the actuating force independently of the strut and which is rotatable against the frictional resistance between the structural members and the intermediate member to enable said part to adjust transversely, provided said resistance does not surpass a given value, said intermediate member being supported for rotation on one of the two said structural members transmitting the actuating force.

4,589,528

DOUBLE-TUBE VIBRATION DAMPER

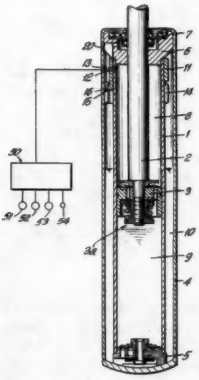
Ludwig Axthammer, Hambach, and Felix Wössner, Schweinfurt, both of Fed. Rep. of Germany, assignors to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany

Filed Aug. 25, 1983, Ser. No. 526,534

Claims priority, application Fed. Rep. of Germany, Aug. 26, 1982, 3231739

Int. Cl.⁴ F16F *9/50, 9/46*

U.S. Cl. 188—279 **31 Claims**



31. A double-tube vibration damper particularly for use in a combination shock absorber spring unit comprising:

a cylinder member having an axis and two ends and defining a cavity therein;

a bottom valve unit adjacent a first end of said cylinder member;

a piston rod guide unit adjacent a second end of said cylinder member;

a piston rod member extending through said piston rod guide unit;

a piston unit connected to said piston rod member within said cavity, said piston unit dividing said cavity into a first working chamber adjacent said first end and a second working chamber adjacent said second end, said piston unit further comprising a piston valve unit interconnecting said first and second working chambers;

a container surrounding said cylinder and defining a compensation chamber in the annular space between said cylinder and said container, said compensation chamber being connected to said first working chamber through said bottom valve unit;

a body of liquid in said cavity;

a body of liquid and a body of gas within said compensation chamber;

a by-pass passage interconnecting said cavity and said compensation chamber;

a by-pass valve unit controlling the cross-sectional area of said by-pass passage, said by-pass valve unit comprising an actuating device;

said actuating device comprising a pressure element, said pressure element defining a pressure element chamber, said pressure element chamber having at least one wall

movable in response to the pressure difference between the pressure element chamber and the surrounding atmosphere, the effective cross-sectional area of said by-pass passage being responsive to the position of said movable wall, said pressure element being housed within said compensation chamber, said pressure element cavity being hermetically closed, a pressure source connected to said double-tube vibrator damper controlling the pressure difference between the pressure element chamber and the surrounding atmosphere.

4,589,529

SUSPENSION STRUTS FOR VEHICLES

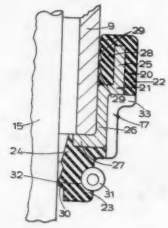
Royston L. Morris, Gwent, Wales, assignor to Lucas Industries, Birmingham, England

Filed Feb. 4, 1985, Ser. No. 698,077

Claims priority, application United Kingdom, Feb. 10, 1984, 8403497

Int. Cl.[4] F16F 9/36

U.S. Cl. 188—322.17 **12 Claims**



1. A suspension strut for a vehicle comprising a cylinder, a piston adapted to work in said cylinder, a piston-rod carrying said piston, a closure for one end of said cylinder and through which said piston-rod passes into said cylinder, a tubular extension depending from said closure and surrounding said piston-rod to define an annular space between itself and said cylinder, said extension being separate from said closure and having a first end adjacent to said closure and second end remote from said closure, a first seal carried by said second end of said extension and through which said piston rod has a slidable sealing engagement, volumes of gas or air and hydraulic fluid retained in said cylinder, and restrictor means in said piston to permit a limited flow of said hydraulic fluid past said piston in both directions in response to relative axial movement between said piston and said cylinder, said gas or air being adapted to support at least a part of the load on said vehicle and to accommodate hydraulic fluid displaced within said cylinder by the volume of the entering piston-rod, wherein said first seal comprises a collar having a first portion which encircles said second end of said extension, a second, depending, continguous portion, and a radial sealing flange included in said second portion and projecting inwardly beyond said inner face of the extension for sealing engagement with said rod.

4,589,530

COLLAPSIBLE WHEELED LUGGAGE WITH STIFFENER

Yuh Y. Sher, 4 Fl., No. 30, Alley 6, Lane 995, Ming Shen E. Rd., Taipei, Taiwan

Filed Jun. 26, 1985, Ser. No. 749,094

Int. Cl.[4] A45C 13/36

U.S. Cl. 190—18 A **3 Claims**

1. An improved luggage comprising:

a main body portion;

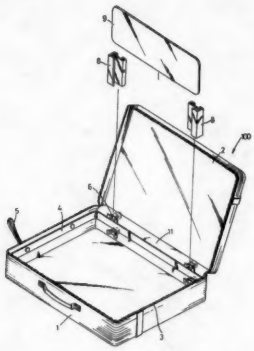
a lid hingedly attached to one side of said main body portion;

closure means provided on said main body portion and said lid for zipping up the luggage;

a supporting frame fastened on inner sides of said main body portion;

two fixing members each having an upper slot and two lower slots;

four casters mounted on the bottom of said main body portion, each said caster having a mounting plate fixedly



attached to the bottom of said main body portion and a wheel assembly connected therewith, said mounting plate being formed with two flanges engageable with the lower slots of said fixing member; and

a stiffening board engageable with the upper slot of said fixing members.

4,589,531

FORCE APPLYING SYSTEM COMBINING DIRECT AND SPRING-APPLIED ELECTRIC ACTUATORS

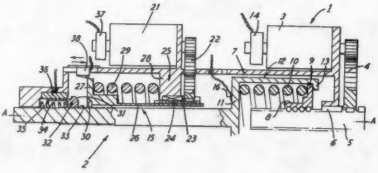
Jack Washbourn, Chippenham, England, assignor to Westinghouse Brake and Signal, Wiltshire, England

Filed May 7, 1984, Ser. No. 607,660

Claims priority, application United Kingdom, Mar. 20, 1984, 8407178

Int. Cl.[4] B60K 41/20

U.S. Cl. 192—2 **7 Claims**



1. A force-applying system comprising a first, direct electric actuator including an electric motor and a second, electrically-controlled spring-applied actuator including a force-applying spring, and an output force-applying member, said apparatus further comprising a control solenoid and a force transfer means for providing operation of said output force-applying member of the second actuator, said force transfer means including a first force transfer member which is operatively loaded by the force-applying spring of the second actuator and a second force transfer member which is controlled by said solenoid such that when the solenoid is energized said second force transfer member is held out of engagement with said first force transfer member and when the solenoid is de-energized the first and second force transfer members are engaged to operatively to connect said force-applying spring to the output member, said system further comprising an electrical circuit means for controlling energization of the solenoid and the

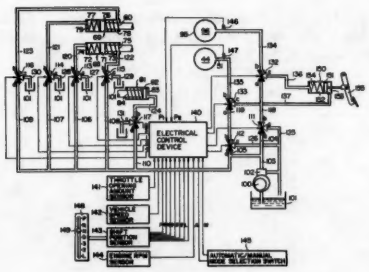
electric motor of the first actuator such that the electric motor of the first actuator is de-energized when the solenoid is de-energized.

4,589,532

SPEED SELECTION MEANS FOR VEHICLE TRANSMISSION SYSTEM PROVIDING EITHER MANUAL OR FULLY AUTOMATIC OPERATION

Hiroshi Ito, and Shigemichi Yamada, both of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota, Japan

Filed Mar. 8, 1983, Ser. No. 473,217
Claims priority, application Japan, Apr. 23, 1982, 57-68407
Int. Cl.[4] B60K *41/22*
U.S. Cl. 192—0.03 **2 Claims**



1. A transmission for an automotive vehicle comprising an engine, comprising:

a gear transmission mechanism which selectively provides a plurality of forward speed stages of successively different reduction gear ratios according to a control signal supplied thereto;

a clutching mechanism including a clutch pedal and a power actuator for selectively power transmittingly connecting or disconnecting said gear transmission mechanism to or from said engine for the convenience of changing over of said speed stages in said gear transmission mechanism, according to operation of said pedal by a vehicle driver or a control signal supplied thereto;

an operational mode selection means for operation by the vehicle driver to set operational mode of the transmission either to automatic or manual operational mode;

a speed/range selection means for operation by the vehicle driver to select ranges of speed stages which are available according to automatic speed change control by said gear transmission mechanism when said operational mode selection means is set to the automatic operational mode and to select any one of said plurality of forward speed stages for said gear transmission mechanism when said operational mode selection means is set to the manual operational mode, said speed/range selection means having the same number of shift positions for forward speed operation of the vehicle as the number of the forward speed stages, wherein, when said operational mode selection means is set to the automatic operational mode, each of said shift positions for forward speed operation provides a range of speed stages that includes a speed stage corresponding to the shift position and all lower forward speed stages, and wherein, when said operational mode selection means is set to the manual operational mode, each of said shift positions provides the speed stage which is the highest in the range of speed stages corresponding to that shift position; and

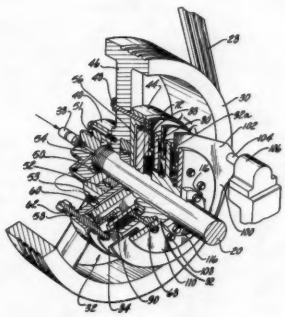
a control means which generates said control signals to be supplied to said gear transmission mechanism and said clutching mechanism according to operational conditions of the vehicle and the engine and the range of speed stages selected by said speed/range selection means when said operational mode selection means is set to select the automatic operational mode and according to the speed stage selected by said speed/range selection means when said operational mode selection means is set to select the manual operational mode.

4,589,533

CLUTCH AND BRAKE ASSEMBLY

Matteo E. Del Duca, 2530 Everts, Windsor, Ontario N9E 2T7, Canada

Filed Mar. 1, 1983, Ser. No. 471,090
Int. Cl.[4] F16D *67/04*
U.S. Cl. 192—18 A **5 Claims**



1. For use with a machine having a motor, a rotatable flywheel driven by said motor and a rotatable output shaft adapted to be driven by said flywheel, a clutch and brake assembly coupled between said flywheel and said shaft, said clutch and brake assembly having an engaged state for drivingly coupling said flywheel with said shaft and a disengaged state for disengaging said flywheel from said shaft, said clutch and brake assembly comprising:

a cylinder secured on said flywheel for rotation therewith and adapted to be coupled with a source of pressurized fluid;

a piston reciprocally mounted within said cylinder and adapted to be longitudinally displaced along the axis of said shaft by the pressure of fluid on said piston;

a spline hub assembly mounted on said shaft for rotation therewith including

(1) a first plate circumscribing said shaft,

(2) a spline hub secured to said shaft and defining first and second splines on opposite sides of said first plate, said first plate being secured to said hub,

(3) second and third plates respectively drivingly coupled with and axially slidable on said first and second splines, said first plate being disposed between said second and third plates,

brake means stationarily mounted on said machine and disposed between said first and second plates for frictionally engaging said second plate;

means for normally biasing said second plate into frictional engagement with said brake means when said clutch assembly is in said disengaged state thereof to prevent rotation of said shaft;

clutch plate means driven by longitudinal displacement of said piston for frictionally coupling said piston with said spline hub assembly when said clutch assembly is in said engaged state thereof to drivingly connect said flywheel with said shaft;

brake release means driven by longitudinal displacement of said piston for defeating said biasing means and disengaging said brake means from said second plate when said clutch assembly is in said engaged state; and

means for mounting said clutch plate means for rotation with

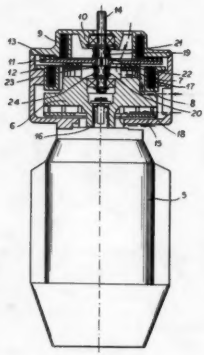
said cylinder and for longitudinal displacement relative to said cylinder, said mounting means including a plurality of guide pins slidably mounted on said cylinder, means for normally biasing said guide pins to slide relative to said cylinder and means for securing said clutch plate means on said guide pins.

4,589,534

ELECTROMECHANICAL DRIVING SYSTEM WITH VARIABLE SPEED

Constantin Apetrei; Sigismund Slaifer; Laurentiu Vatafu-Gaitan; Dumitru Stefanescu; Stelian Marinescu, and Marin Catana, all of Bucharest, Romania, assignors to Institutul de Cercetare Stintifica si Inginerie Technologica Pentrj Industria Electrotehnica, Bucharest, Romania

Filed Feb. 4, 1983, Ser. No. 463,830
Int. Cl.[4] F16D *67/06*; H02K *7/112*
U.S. Cl. 192—18 B **5 Claims**



1. A variable speed drive comprising:

an asynchronous motor having a motor shaft extending from one end of said motor;

a housing disposed at said end of said motor and enclosing said motor shaft;

a flywheel in said housing mounted on said motor shaft and formed with an annular surface facing axially away from said motor;

an output shaft journaled in said housing coaxially with said motor shaft and having an end extending from said housing for connection to a load, said output shaft having a splined portion disposed in said housing;

a ferromagnetic disc rotatably entrained with said output shaft in said housing and axially shiftable on said splined portion, said disc being formed on a side confronting said surface with a first ring of friction material and being provided on its opposite side with a second ring of friction material juxtaposed with an annular surface of said housing surrounding said output shaft;

an electromagnetic coil mounted on said housing coaxial with said output shaft within the circumference of said disc and axially juxtaposed therewith whereby energization of said coil attracts said disc in one axial direction so that one of said rings engages a respective one of said surfaces; and

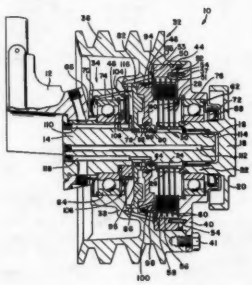
means in said housing for displacing said disc in an opposite axial direction whereby the other of said rings engages the other of said surfaces and the relative engagements of said rings with the respective surfaces as controlled at least in part by the duration of energization of said electromagnetic coil determines the speed of said output shaft, wherein said flywheel is formed proximal to its said surface juxtaposed with said first ring with an array of vanes inducing a flow of cool air axially into said housing through an opening provided outwardly of said output shaft, said disc being provided with at least one opening traversed by the cooling air induced into said housing by said vanes, said vanes directing said flow of air along an inner periphery of said electromagnetic coil and radially outwardly through at least one opening formed in a peripheral wall of said housing.

4,589,535

FAN CLUTCH WITH REPLACEABLE PLATE CARRIER MEMBER

John L. Hall, Middleburg Hts.; Dennis R. Shamine, Lorain, and James P. Koenig, Olmsted Twp., Lorain County, all of Ohio, assignors to Allied Corporation, Morristown, N.J.

Filed Sep. 17, 1984, Ser. No. 650,951
Int. Cl.[4] F16D *13/70, 13/74*
U.S. Cl. 192—70.12 **10 Claims**



1. Clutch assembly comprising a fixed support, an input member and an output member mounted on said fixed support, bearing means for rotatably mounting the input and output members on said fixed support for rotation relative to the fixed support and relative to one another, a first set of clutch plates drivingly connected to said output member, a second set of clutch plates drivingly connected with the input member and cooperatively arranged with the first set of clutch plates to provide a driving connection therebetween when the clutch is engaged, one of said members including a housing, said housing defining a stepped bore coaxial with the axis of rotation of said input and output members, said bore having larger and smaller diameter portions with a shoulder therebetween, said shoulder cooperating with the larger portion of the bore to define an annular cavity, an annular clutch plate carrying member coaxial with said bore and received within said annular cavity, said clutch plate carrying member having axially projecting inner and outer circumferential surfaces, a pair of axially spaced, radially projecting surfaces interconnecting said axially projecting surfaces, said radially projecting surfaces being engaged by said shoulder and with said housing to retain the carrying member in said cavity, mounting means carried on said inner diameter surface slidably mounting said second set of clutch plates for movement coaxially with said bore, said mounting means being located between said radially projecting surfaces, means drivingly connecting the clutch plate carrying member with the input member, and fluid pressure responsive means separate from and offset radially with respect to said clutch plate carrying member, said fluid pressure responsive means being actuable to urge said first and second sets of clutch plates into driving engagement with one another.

4,589,536

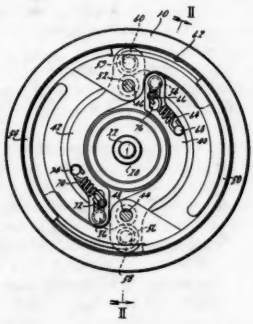
ELECTROMAGNETIC FRICTION CLUTCH

Guntis V. Strikis, Belleville, and Zaki C. Bekheet, Canton, both of Mich., assignors to Ford Motor Company, Dearborn, Mich.

Filed Sep. 4, 1984, Ser. No. 647,310

Int. Cl.[4] F16D *47/00, 13/18, 27/10*

U.S. Cl. 192—35 **12 Claims**



7. A clutch for selectively coupling and uncoupling members comprising:

a rotatably mounted driving member;

a rotatably mounted driven member;

first and second clutch shoes pivotably mounted for engagement with and disengagement from the driving member;

a first lever means including a first pin fixed to the driven member, a first lever pivotably mounted on the first pin having a first end distant from the first pin and selectively connectable to the driving member, and a second end located near the first pin connected to the first clutch shoe eccentric of the pivot of the first clutch shoe;

second lever means including a fourth pin fixed to the driven member, a second lever pivotably mounted on the fourth pin having a first end distant from the first pin selectively connectable to the driving member, and a second end located near the fourth pin connected to the second brake shoe eccentric of the pivot of the second clutch shoe; and

means for selectively connecting the first lever and the second lever to the driving member, including

a friction plate adapted to engage driveably, to disengage and to turn with the driving member, a coil of wire located adjacent the friction plate adapted for connection to a source of electrical current, whereby the friction plate is forced into engagement with the driving member when the coil is energized and is disengaged from the driving member when the coil is deenergized.

4,589,537

LOCK-UP CONTROL DEVICE FOR TORQUE CONVERTER IN AUTOMATIC TRANSMISSION FOR VEHICLE

Masao Nishikawa, Tokyo; Yoshimi Sakurai, Tanashi; Takashi Aoki, Fujimi, and Yoichi Sato, Wako, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

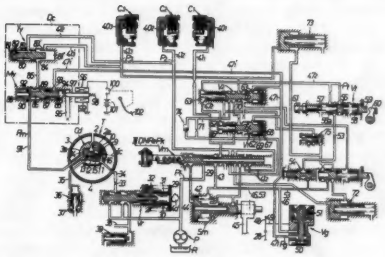
Filed Nov. 14, 1983, Ser. No. 551,739

Claims priority, application Japan, Nov. 12, 1982, 57-198504; Dec. 10, 1982, 57-216355

Int. Cl.[4] B60K *45/02, 41/28*

U.S. Cl. 192—0.052 **5 Claims**

1. In an automatic transmission comprising a fluid type torque converter having an input member including a pump vane wheel and an ouput member including a turbine vane wheel, and an auxiliary transmission having one or plural stages of gear trains through which the torque of said output member is transmitted to driving wheels, a lock-up control device for a torque converter in an automatic transmission for vehicle comprising a hydraulic direct coupling clutch having a slip characteristic provided between the input and output members of the torque converter and capable of mechanically coupling said both members and a modulator valve disposed in an oil passage for connecting an oil pressure cylinder of said direct coupling clutch with an oil pressure source, said modulator valve being composed of a valve body for opening and closing said oil passage, a spring for biasing said valve body in a valve-opening direction, a first oil pressure chamber for introducing pilot oil pressure for biasing said valve body in a



valve-closing direction from an input port side of said modulator valve, and a second pilot oil pressure chamber for introducing pilot oil pressure for biasing said valve body in the valve-opening direction, wherein an output side of a device for generating oil pressure proportional to vehicle speed for releasing oil pressure which is changed proportional to the vehicle speed is connected through a throttle to said second pilot oil pressure chamber and a valve device for detecting the idle state of an engine throttle valve to release said second pilot oil pressure chamber to atmosphere is connected to said second pilot oil pressure chamber.

4,589,538

DEVICE FOR LOCKING AND RELEASING OBJECTS INTENDED FOR PUBLIC USE, SUCH AS LUGGAGE CARTS

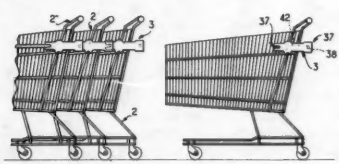
Henri-André Payraudeau, Draguignan, France, assignor to MORS, France

Filed Jul. 18, 1983, Ser. No. 515,372

Claims priority, application France, Feb. 18, 1983, 83 02716; Apr. 26, 1983, 83 06857

Int. Cl.[4] G07F *17/10*

U.S. Cl. 194—205 **9 Claims**



1. A device for locking and releasing objects intended for public use, especially objects intended to be put at public disposal free of charge such as luggage carts in a railway station or an airport or shopping carts in self-service stores, such objects capable of being taken directly from a common storage station and returned to the storage station,

said device including a locking apparatus in the form of a casing and adapted to be affixed to a part of each object,

attaching means for affixing said locking apparatus to a part of each object,

a connecting lock having male and female means secured to

respective longitudinal endmost portions of said casing forming said locking apparatus, for locking each object to an adjacent object or to a fixed point in compact storage position, and

a slit provided in said casing through which a coin or the like is introduced to allow unlocking of said locking apparatus and release of the object by exerting a pull thereon,

said locking apparatus being arranged to return the coin or the like when the object is returned to the storage station and is locked by said connecting lock to the adjacent object or to the fixed point,

wherein said female means is constituted by a clamp comprising two unsymmetrical jaws, and said male means is constituted by a connecting bar secured to the object or to the fixed point, and having a diameter perfectly calibrated so that said male means can fit in between said jaws, and wherein said locking apparatus comprises

a slide provided with a tongue blocking said clamp in locked position so as to lock said connecting lock connecting the object to the adjacent object or to the fixed point,

an internal blocking member for fixing said slide and being movable to a non-blocking position by coming into contact with an edge of the coin introduced within said slit,

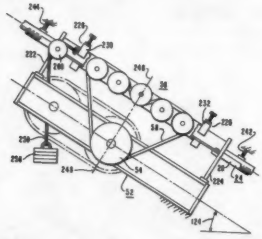
said slide being movable within said casing, after introducing the coin within the slit, under the single action of the pull on the object which is directly applied to the slide so as to successively move the blocking member to the non-blocking position by coming into contact with the edge of the inserted coin, unlock the clamp of the connecting lock connecting the object to the adjacent object or to the fixed point and release the object.

4,589,539

TRANSPORTATION APPARATUS HAVING A MOVING HANDRAIL

Henry Boltrek, Freeport, N.Y., and Edward F. Parvis, Roxbury, N.J., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Sep. 15, 1983, Ser. No. 532,436
Int. Cl.[4] B66B *21/00, 23/06*
U.S. Cl. 198—331 **7 Claims**



1. An escalator comprising:

a truss, said truss having an inclined portion,

a conveyor supported by said truss, said conveyor including a plurality of steps disposed in an endless loop which includes an inclined portion for transporting persons between spaced landings,

at least one conveyor drive unit mounted in the inclined portion of said truss for driving the conveyor and said plurality of steps in the endless loop,

an endless flexible handrail,

handrail guide means supported by said truss and extending between the spaced landings for guiding the handrail in a closed loop, with the closed handrail loop including upper and return runs each having an inclined portion,

handrail drive means disposed immediately above said at least one conveyor drive unit and positioned to engage the handrail on the inclined portion of the return run, to provide a driving force for driving the handrail about the closed loop, with the handrail drive means including a plurality of spaced pairs of rollers, with each pair including a traction roller in contact with a first surface of the handrail, a pressure roller in contact with a second surface disposed opposite the first surface, and means providing a biasing force, unrelated to the handrail driving force, for biasing the pressure roller against the second surface,

belt means disposed to link both said at least one conveyor drive unit and said handrail drive means, to cause rotation of the traction rollers,

tension means for automatically providing the desired tension in the belt means, notwithstanding wear thereof or adjustment of said at least one conveyor drive unit along the inclined portion of said truss,

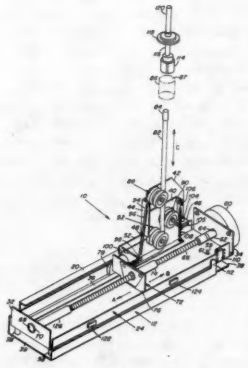
said tension means including means mounting the handrail drive means for guided, longitudinal movement along the incline of the return run, such that the handrail drive means is free to move along the handrail with positional adjustment of said at least one conveyor drive unit along the inclined portion of said truss, and such that when the position of said at least one conveyor drive unit is fixed, movement of said handrail drive means along the handrail is restrained only by the belt means, with the effective weight of the handrail drive means on the handrail being selected such that a summation of the forces in the belt means due to the effective weight of the handrail drive means and the force required to drive the handrail about its closed loop produces a net desired tensioning force in the belt means.

4,589,540

SAMPLE CONTAINER TRANSFER MECHANISM

Richard S. Kampf, Costa Mesa, Calif., assignor to Beckman Instruments, Inc., Fullerton, Calif.

Continuation of Ser. No. 328,342, Dec. 7, 1981, abandoned. This application Oct. 15, 1984, Ser. No. 660,562
Int. Cl.[4] B65G *47/00*
U.S. Cl. 198—345 **8 Claims**



1. A transfer assembly for moving a container between a first position and a second position, said assembly comprising:

a support base;

an elongated flexible transport member postioned on said support base and having one end contacting said container;

means for moving said one end of said transport member between said first and second positions;

means mounted on said support base for directing travel of said transport member from a first longitudinal direction

to a second longitudinal direction at an anglee to said first longitudinal direction;

means mounted adjacent said directing means for guiding said one end of said transport member in a straight line travel path unsupported between said first and second positions, said guiding means comprising an adjustment frame pivotally connected to said support base;

first means for biasing said frame in one direction;

second means for biasing said frame in a second lateral direction;

means for supporting said transport member mounted to said frame;

means provided with said frame for adjusting the amount of pivotal movement of said frame relative to said support base caused by said first biasing means; and

means provided with said frame for adjusting the amount of pivotal movement of said frame relative to said support base caused by said second biasing means.

4,589,541

DEVICE FOR THE CONVEYANCE OF TABULAR ELEMENTS

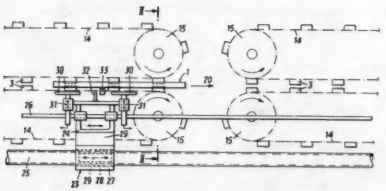
Peter Lisec, Bahnhofstrasse 34, Amstetten-Hausmening, Austria

Filed Jan. 12, 1984, Ser. No. 570,196

Claims priority, application Austria, Apr. 25, 1983, 1498/83

Int. Cl.⁴ B65G *25/00*

U.S. Cl. 198—468.4 **6 Claims**



1. Device for the conveyance of a tabular element **(1)** on edge, comprising horizontal conveyor belt means **(3, 14)** in two sections having a gap therebetween, by means of which the tabular element **(1)** is supported from below, a towing device **(23, 35)** which seizes the tabular element **(1)** on at least one of its side surfaces, a guideway **(25, 26; 40)** on which the towing device **(23, 35)** is guided displaceably back and forth in a direction parallel to the conveyance direction **(20)**, the guideway being of a length such that the towing device **(23, 35)** moves with the tabular element **(1)** it has seized, from one said conveyor belt section across said gap until the tabular element is again supported from below the other said conveyor belt section, and means to fix the linear speed of the towing device **(23, 35)** in the conveyance direction **(20)** at precisely that of the conveyor belt **(3, 14)**, the towing device **(23)** being coupled with the conveyor belt **(3, 14)** for synchronizing its speed of movement with the speed of the conveyor belt **(3, 14)**, and stops **(32, 33)** which engage with each other on both the conveyor belt **(3, 14)** and the towing device **(23)**.

4,589,542

CARGO DRIVE UNIT

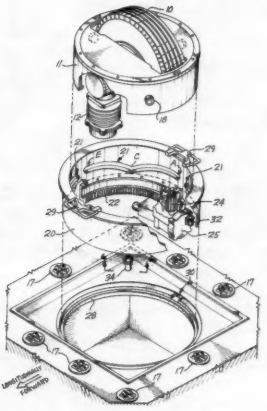
Stephen T. Steadman, Redmond, Wash., assignor to The Boeing Company, Seattle, Wash.

Filed Dec. 19, 1983, Ser. No. 562,604

Int. Cl.⁴ B65G *13/02*

U.S. Cl. 198—782 **2 Claims**

1. A powered drive wheel module for insertion into a mating support opening in the floor structure of an airplane and functioning to move cargo in a horizontal plane, comprising: a wheel mounted on an axle; an inner ring member for supportably housing the wheel and axle; power means mounted to said inner ring member, for rotatably driving the wheel about a horizontal axis; an outer ring member non-rotatably and removably mounted within the mating support opening in the floor structure; a cam system interposed between the inner ring member and the outer ring member, for supportably mounting the inner ring member for rotation within the stationary outer ring member; a ring gear segment fixedly connected to the skirt of the outer ring member; a powered pinion gear mounted to said inner ring member for meshing with the ring gear segment, to rotate the inner ring member relative to the stationary outer ring member; steering limit switches interposed between the inner ring member and the outer ring member for angular logic control of the powered drive wheel and for directional orientation change of the horizontal driving force of the wheel; said steering limit switches being independently adjustable, with the powered drive wheel module completely removed



from the mating support opening in the floor structure, thereby minimizing tolerance and interface control problems; and said cam system, through rotation of the ring gear segment by said powered pinion gear, vertically positioning the wheel to a raised position for maximum frictional engagement with the undersurface of cargo positioned thereon to move it in a horizontal direction, and a lowered position for complete disengagement with the undersurface of cargo; said outer ring having abutment means projecting outwardly which is received in at least one complimentary recess for preventing rotation of the outer ring about a vertical axis relative to the floor structure forming the mating opening whereby removal of the outer ring from the floor structure results in removal of the powered wheel module including the means to vertically position and provide angular position logic control of the wheel.

4,589,543

DRIVE SHAFT FOR SLAT CONVEYOR

Hugo S. Hastem-Müller, Oettinger Strasse 9, 8860 Nördlingen, Fed. Rep. of Germany

Filed Oct. 5, 1984, Ser. No. 658,188

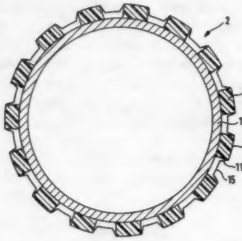
Claims priority, application Fed. Rep. of Germany, Oct. 7, 1983, 3336969

Int. Cl.⁴ B65G *23/06*

U.S. Cl. 198—834 **4 Claims**

1. A drive shaft for a slat conveyor having a slat conveyor belt running over the drive shaft and at least one additional shaft, in which the slats on which the cargo is carried are fastened to endless carrier belts spaced apart side-by-side in the direction of conveyance, said carrier belts being equipped on their underside with teeth set transversely to the direction of conveyance and engaging corresponding grooves in at least the drive shaft, comprising the grooves **(15)** are made in steel plate rings **(11)** mounted on said drive shaft **(2)** at least in the

area of the carrier belts (5) which steel plate rings are stamped meander-wise corresponding to the division and shape of said teeth (7), and that between the projections (12) defined by



adjacent grooves (15) of said steel plate rings (11) and the preferably smooth surface of said shaft (2) molded shapes (13) of an elastomer are mounted, supported pre-loaded on the surface of said shaft (2).

4,589,544

ARRANGEMENT FOR FILING AND STORAGE OF FLAT-SHAPED ARTICLES

Dieter Schweinsberg, Lautertal, Fed. Rep. of Germany, assignor to Datox Organisation D. Schweinsberg GmbH & Co. KG, Rödental, Fed. Rep. of Germany

Filed Apr. 3, 1984, Ser. No. 596,408

Claims priority, application Fed. Rep. of Germany, Apr. 28, 1983, 8312485[U]

Int. Cl.⁴ B65D *27/10*

U.S. Cl. 206—45 **8 Claims**

1. Arrangement for filing and storage of flat-shaped articles or articles in form of sheets or film, particularly flat information media, in form of diskettes, microfilms, audio recordings, photographs, and file cards, a plurality of pocket-like folders ranked one after another in any desired number to accommodate the articles; said folders having front members and back members and being connected together by side edges so that each folder is laterally secured in relation to the folder immediately in front of it and retained to be displaceable upward to a predetermined extent; each folder except for the frontmost folder, having a tongue on the front member that engages a hole in the back member of the folder immediately in front of it; each back member having a hole engaged by the tongue of the folder immediately in rear of the back member with said hole; each folder except for the rearmost folder having a back member with a flap that is fold 180° back and down and slips into and engages the folder immediately behind it, said flap encompassing together with its respective back member the front of the folder immediately behind it; said flap guiding adjacent folders along sides of the folders, said folders being displaceable relative to each other by being guided on sides by said flap, said tongue having means engaging said hole for limiting relative displacement of folders in height direction.

4,589,545

CIGARETTE PACKAGE

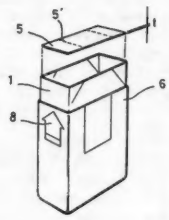
Jangil Choe, 21-106 woo sung apartment seo cho-dong, Kang nam-Ku, Seoul, Rep. of Korea

Filed Mar. 23, 1984, Ser. No. 592,540

Claims priority, application Rep. of Korea, Jun. 16, 1983, 5273

Int. Cl.⁴ A24F *15/00*; B65D *85/10*

U.S. Cl. 206—264 **1 Claim**



1. In a cigarette package containing three side-by-side rows of side-by-side cigarettes and having an inner paper wrapper having a folded and sealed portion at one end adapted to be opened for removal of the cirgarettes, an outer cellophane wrapper, and a tear tape for removing the end of the cellophane wrapper corresponding to the folded and sealed end portion of the inner wrapper, the improvement of a cut-open device for the sealed end portion of the inner wrapper, the cut-open device being a planar strip of material having its edges coextensive with the end of the package and received between the ends of the cigarettes and the sealed end portion of the inner wrapper and having two rows of perforations extending transversely and spaced-apart from the ends of the strip, the strip of material having sufficient strength and stiffness to tear the sealed end portion of the paper wrapper along a zone coextensive with the portion defined by a row of perforations and the perimeter of an end portion thereof.

4,589,546

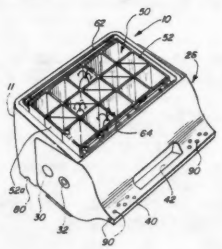
FISHING LURE STORAGE AND TRANSPORTATION STRUCTURE

Francis S. Sunderland, 2925 Witchwood La., Waukegan, Ill. 60087

Filed Jan. 10, 1985, Ser. No. 690,258

Int. Cl.⁴ A01K *97/00*; B65D *55/10*

U.S. Cl. 206—315.11 **9 Claims**



1. A portable container for storing fishing lures comprising, a container body having an insulated double wall construction providing an interior recess and having an interior bottom wall, a plurality of rows of interconnected upright tubes positioned in said recess and with parts thereof spaced from said

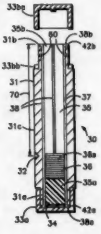
interior bottom wall, a series of openings through said double wall at the bottom perimeter of said container body for outward flow of water and inward flow of air, a noninsulated enclosing lid for said container body which is upwardly tapered to provide a space above the upper ends of said upright tubes, and air-circulating openings in said lid generally at the top of said space whereby air can flow into the container through said series of openings and out of the container through the openings in said lid for drying the fishing lures with the airflow being induced by a thermo-siphon action with the hottest air in the uninsulated space beneath the lid and the coolest air entering said series of openings and with the air remaining relatively cool in the container body because of the insulated double wall construction but gradually rising in temperature as the air flows upwardly to result in differential temperatures in the container with a relatively cool environment for fishing lures in the tubes within the container body.

4,589,547

CARRIER FOR STACKED SEMICONDUCTOR DIE

Timothy C. Stewart, Scottsdale; Leo Ofman, Glendale; Kelvin R. Blair, Tempe, and Randolph M. Gregg, Mesa, all of Ariz., assignors to Motorola Inc., Schaumburg, Ill.

Filed Jan. 14, 1983, Ser. No. 458,072
Int. Cl.⁴ B65D *73/02*
U.S. Cl. 206—328 **3 Claims**



1. A semiconductor die carrier for moveably holding semiconductor die of predetermined first lateral size and shape in a stacked relationship, comprising:

a hollow tube having a longitudinal bore of predetermined second lateral size and shape larger than said first lateral size and shape, said bore having an interior surface;

at least six longitudinal metallic rails spaced around said bore and protruding from said interior surface into said bore to form a longitudinal cage of internal third lateral size and shape larger than said die, for guiding and aligning said semiconductor die in a stacked relationship within said bore, and wherein said longitudinal metallic rails comprise bent-over portions which mate with notches in said interior bore adapted to retain said metallic rails in said interior bore.

4,589,548

SPUTUM COLLECTION APPARATUS

John E. Fay, Leominster, Mass., assignor to Biomedical Polymers, Inc., Leominster, Mass.

Filed Dec. 6, 1984, Ser. No. 679,208
Int. Cl.⁴ B65D *83/10*
U.S. Cl. 206—363 **25 Claims**

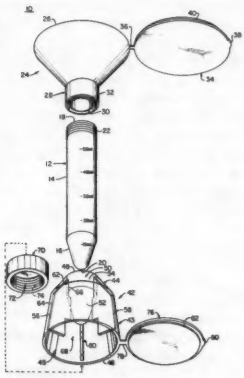
1. An apparatus for collecting sputum comprising:

a sputum container having an open end and a closed end;

a funnel including a mouth at one end and a discharge portion at the other end, said discharge portion being removably attachable to said container to establish fluid communication between said funnel and said container;

a cap for removably covering the container opening; and

a short base remote from said funnel and having a top which includes a recess for receiving the closed end of said container to support at least a portion of said container above said base, said container being the sole structural, interconnection between said funnel and base, said base includes a chamber with an opening at its lower end, and means mounted within said chamber for releasably holding said cap with the inside of said cap facing said chamber



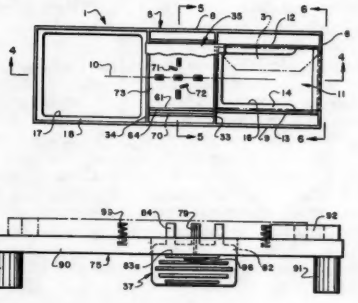
opening to enable said cap to be attached to said container and cover the open end of said container when said container is introduced generally axially into said base and be properly seated on and removed by said container without direct handling when said container is withdrawn from said base.

4,589,549

AUDIO CASSETTE PACKAGE

Bruce A. Hehn, N. Canton, Ohio, assignor to Alpha Enterprises, Inc., Canton, Ohio

Filed Mar. 19, 1984, Ser. No. 590,717
Int. Cl.⁴ B65D *85/672*
U.S. Cl. 206—387 **31 Claims**



1. A package construction for holding an audio cassette, said construction including:

(a) an integral one-piece plastic housing having a cassette storage compartment formed therein, said compartment having an access opening for inserting and removing a cassette into and out of said compartment;

(b) lock means including a slide plate slidably mounted on the housing and movable across the access opening between locked and unlocked positions, respectively, for releasably securing a cassette in the compartment, said slide plate having at least one lever formed thereon;

(c) projection means formed on the housing for projecting within said housing being located and configured to en-

gage the lever for retaining the slide plate in the lock position to secure a cassette in the storage compartment; and

(d) separate key means engageable with the slide plate lever for moving said lever out of engagement with the projection means enabling the slide plate to be moved from the locked position to the unlocked position for removing a cassette from the storage compartment.

28. A device having integrated key means for holding and removing an object from a package, said device having a horizontal base with the key means projecting upwardly from the base and located and oriented to engage a locking and manually moveable means of a package when said package is placed on said base to unlock said locking and manually moveable means to remove an object from the package; and spring means for biasing said object away from said horizontal base mounted on the base and located for automatically ejecting an object from a storage compartment of the package upon the package being unlocked by said key means.

4,589,550

WELDING ROD PACKAGE

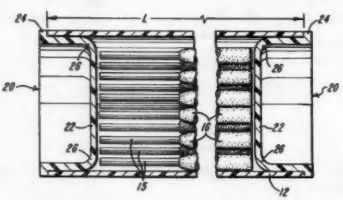
Daniel J. Stager, 110 Long St., Pleasant Hill, Ohio 45359

Filed Jan. 24, 1985, Ser. No. 694,653

The portion of the term of this patent subsequent to Feb. 5, 2002, has been disclaimed.

Int. Cl.[4] **B65D** *85/26, 59/02*

U.S. Cl. 206—443 **19 Claims**



1. A welding rod package for use in shipping and storing welding rods in a protected environment, comprising a bundle of welding rods having a predetermined length, an elongated substantially air-impervious tube, said tube having opposite end portions and surrounding said bundle of rods, said tube extending the length of said rods and having substantial rigidity for protecting said rods against an impact, a set of substantially air-impervious end closure members engaging said opposite end portions of said tube in press-fit relation, each of said end closure members conforming to the corresponding said end portion of said tube and forming an air-resistant friction seal with said end portion, and at least one of said closure members being removable from the corresponding said end portion of said tube and resealable therewith to form an economical and reusable air-resistant enclosure for the welding rods.

4,589,551

CONTAINER FOR HANDLING, TRANSPORTATION AND STORAGE OF MICROSCOPE SLIDES

Keith Hellon, Libertyville, Ill., assignor to MacLean-Fogg Company, Mundelein, Ill.

Filed Jul. 31, 1984, Ser. No. 636,319

Int. Cl.[4] **B65D** *85/48, 1/36*

U.S. Cl. 206—456 **12 Claims**

1. A container for removably retaining a plurality of microscope slides in a predetermined spaced relationship, one to another, comprising:

a generally planar lower wall having a generally planar inner surface and a generally planar outer surface;

a plurality of partition walls extending upwardly from said inner surface of said lower wall defining a plurality of rectangular microscope slide-receiving compartments for spacing a plurality of microscope slides in a predetermined, spaced relationship, longitudinally and laterally one to another, above said inner surface of said lower wall;

a plurality of protuberances within each of said slide-receiving compartments extending upwardly from the inner surface of said lower wall a shorter distance than the upward extension of the partition walls, said protuberances adapted to contact a lower surface of a microscope slide to space the microscope slide upwardly from the inner surface of said lower wall while maintaining longitudinal and lateral spacing of said microscope slides;

a plastic cover member having a generally planar first surface adapted to overlie a plurality of microscope slides, in

spaced relationship therewith, when the cover member is in the closed position, and a generally planar second surface forming an outer surface of the container when said cover member is in a closed position; said first surface including a plurality of rounded protuberances extending thereform within each of the slide-receiving compartments when the cover is in a closed position; and

an elongated hinge member formed of a flexible material secured to an outer surface of the container and to said plastic cover member, said hinge member disposed to enable said cover member to be rotated from said closed position wherein the first surface overlies a plurality of microscope slides to an open, stackable position wherein the second surface of the cover member is disposed adjacent the outer surface of the lower wall.

4,589,552

PACKAGE COMPRISING A STRIP AND SIDE FLAPS

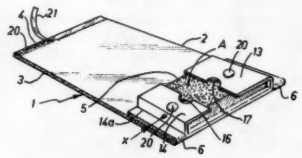
Pierre Chevalier, 31, Boulevard d'Auteuil, Boulogne sur Seine, France (92100)

Filed Apr. 19, 1985, Ser. No. 724,836

Claims priority, application France, Apr. 19, 1984, 84 06225

Int. Cl.[4] **B65D** *73/00*

U.S. Cl. 206—492 **10 Claims**

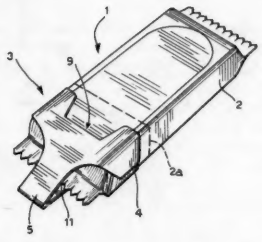


1. Package comprising a strip having an inside surface adapted to receive articles to be packaged and two transverse flaps in face-to-face relationship attached to said inside surface of said strip on two side bands which extend from the longitudinal edges thereof over a defined distance x, parallel to said longitudinal edges of said strip, wherein said strip comprises an end panel which features a transverse fold and is cut in line with said transverse fold in a central part between said side bands and said end panel is divided into two flaps by a median longitudinal slit, whereby said end panel may be folded over said inside surface of said strip by bending it about said transverse fold and fastened to said strip by said side bands.

4,589,553
PACKAGE FOR FOOD PRODUCTS

Pietro Ferrero, Rhode St. Genese, Belgium, assignor to Ferrero S.p.A., Alba, Italy

Filed Jun. 15, 1984, Ser. No. 620,829
Claims priority, application Italy, Jul. 22, 1983, 53588/83[U]
Int. Cl.[4] B65D *85/60, 85/78*
U.S. Cl. 206—525 8 Claims



1. A package for a rigid or semi-rigid food product, comprising in combination:

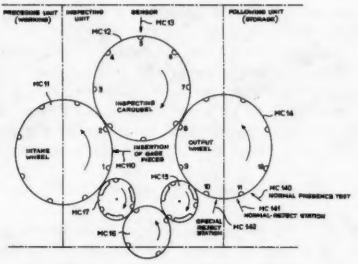
a wrapper sheet which encloses a food product having a generally rectangular cross-section, the wrapper sheet having a rupture line extending in a transverse intermediate plane relative to the product along which the wrapper sheet can be torn, and

a take-up member which at least partly surrounds a portion of the wrapper sheet between one end of the product and the said transverse intermediate plane, the take-up member comprising a collar part which surrounds the said portion of the wrapper sheet and which is provided with two larger flat opposing sides, each of which has a generally U-shaped notch in its edge facing towards said transverse intermediate plane through which the portion of the product surrounded by the collar part can be rendered accessible, said take-up member being capable of being gripped to enable the wrapped product to be held.

4,589,554
SELF-CALIBRATING PRODUCTS SYSTEM AND METHOD

Pierre Edelbruck, Kingersheim; Georges Melzac, Illzach, and Bernard Caullet, Pfastatt, all of France, assignors to Manufacture de Machines du Haut-Rhin, Mulhouse, France

Filed Aug. 12, 1983, Ser. No. 523,040
Claims priority, application France, Aug. 12, 1982, 82 14047
Int. Cl.[4] B07C *5/00;* G05B *23/02*
U.S. Cl. 209—546 9 Claims



1. An installation for assembly line manufacture of workpieces wherein said workpieces move in a row along a production path at a generally uniform spacing, said installation comprising:

a feeding unit capable of receiving a stock of workpieces for machining, and placing them in a predetermined position on a sprocket wheel, at least one working unit, capable of defining a continuous flow of the workpieces between a honeycombed wheel upstream, which cooperates with the sprocket wheel, and a honeycombed wheel downstream, at least one working carousel being provided between the honeycombed wheels upstream and downstream, this working carousel being capable of effecting at least one operation of said machining, an inspecting unit comprising at least one inspecting carousel for a measuring operation relating to the above-mentioned work that has been performed by said working carousel, and command logic means capable of supervising and coordinating the action of the consecutive units keeping in account the continuous flow of the workpieces, while effecting, in real time, measures for each workpiece and ejecting those workpieces the measure of which is outside of a tolerance, characterized in that the number of seats (P) in the working carousel is larger than the number of seats (Q) in the inspecting carousel, these two numbers not being multiples, one of the other, that the logic command means comprises

a basal logic arrangement capable of functioning for the acquisition, calibration and correction of measures, as a function of the calibration, by interaction with the inspecting unit, as well as a processing logic arrangement, for controlling said feeding unit, said working carousel and said inspecting unit and for surveilling the installation assembly, said processing logic arrangement including a first logic arrangement, which has a logic element for each of the units, the logic element associated with the inspecting unit being connected to the basal logic arrangement, all of which being disposed for commanding the ejection of workpieces, the measurement of which does not fall between maximum and minimum measurements defining said tolerance, the processing logic arrangement further including a second logic arrangement, connected to said logic elements of the first logic arrangement, as well as a general command keyboard, this second logic arrangement centralizes the assembly of the aforesaid arrangements of the installation, particularly the data relative to the workpiece emitted each time that the continuous flow progresses one seat, this data including an identification part which has at least one unit number P and one unit number Q, the indication of an eventual reject, and the measures effected, which permits the establishment in real time and in a simple manner, of a production statistic.

4,589,555
MAIL SORTING APPARATUS AND METHOD

James A. Hollingsworth, 4057 S. Wisteria Way, Denver, Colo. 80237

Filed Aug. 12, 1983, Ser. No. 522,535
Int. Cl.[4] B07C *3/20*
U.S. Cl. 209—703 4 Claims

1. A variable speed mail sorting apparatus for manual mail sorting when used with the exit end of a conveyor table associated with commercial mail inserting equipment comprising:

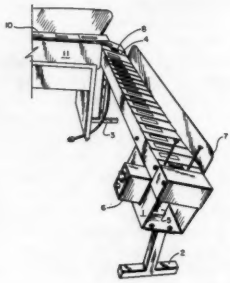
sorting table surface means for receiving and collecting pieces of mail for subsequent manual sorting;

support means for supporting the sorting table surface means at a height generally below the height of the mail handling conveyor table used, said surface means being generally rectangular and generally angled from the horizontal, downwardly in a direction away from the exit end of the mail inseting conveyor table at a preselected angle for receiving said pieces of mail in a shingled overlapping relationship, said surface means being generally perpendicular and adjacent to said conveyor table and extending past the exit end of the conveyor table a sufficient distance to receive articles conveyed by said conveyor table, said

surface means being wide enough to completely receive articles delivered from the exit end of the conveyor table;

guide means located on the lower side of the surface means on said sorting table extending upwardly therefrom and capable of preventing articles received onto the surface means for sliding off the sorting table after being delivered thereto; and

first conveying means included on said sorting table surface means for conveying articles received on said surface means from a position near the exit end of the conveyor table to a position remote therefrom whereby the mail



articles are received in a preselected timed relationship from the conveyor table and are moved on said surface means by said first conveying means at a preselected speed so as to be retained in a predetermined overlapping relationship on said sorting table surface means by said guide means and are conveyed in said predetermined overlapping relationship by said first conveying means generally perpendicularly, from the conveyor table in a direction away from the position where they are received on the surface means, so as to be capable of manual sorting by zip code breaks.

4,589,556

HOLDER ASSEMBLY FOR STEMMED GLASSWARE AND LIKE OBJECTS

Steven I. Peretz, 258 NE. 27 St., Miami, Fla. 33137

Filed Jun. 3, 1985, Ser. No. 740,364

Int. Cl.[4] A47F *5/01*

U.S. Cl. 211—41 **20 Claims**

1. A holder assembly for a stemmed object such as glassware and like articles, primarily designed to secure the article in a dishwasher in a preferred orientation for cleaning thereof, said holder assembly comprising:

(a) gripping means for securing a stemmed object in a preferred cleaning orientation and comprising at least one gripping assembly structured for detachable engagement with the stemmed object,

(b) base means for support of said gripping means and being interconnected thereto and structured for securement of said holder assembly in substantially upstanding relation to a supporting surface,

(c) stanchion means for interconnecting said gripping means to said base means in spaced and substantially overhanging relation thereto,

(d) said one gripping assembly comprising a supporting portion and a retaining portion disposed in adjacent and spaced relation to one another and cooperatively structured and disposed to removably mount the stemmed object thereon,

(e) said supporting portion structured to supportingly engage one side of a base of the stemmed object and said retaining portion disposed to engage an opposite side of the base,

(f) said stanchion means being of sufficient longitudinal dimension to allow a substantially suspended orientation of the stemmed object in an inverted position facing said base means,

(g) whereby the stemmed object is removably positionable within a dishwasher in a preferred orientation for cleaning thereof.

4,589,557

MOUNTING MEANS FOR (RELEASABLY AND MOVABLY) MOUNTING DEVICES ON A WALL, PARTICULARLY IN CLINICS, FIRST AID OR SURGERY ROOMS, AND THE LIKE; AND MANUFACTURING METHOD FOR SAID MOUNTING MEANS

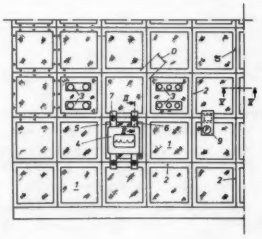
Armin A. Bollmann, Rosenstrasse 10, Friedrichsthal, Saarland, Fed. Rep. of Germany (6605)

Filed Jul. 3, 1984, Ser. No. 627,910

Claims priority, application Fed. Rep. of Germany, Jul. 9, 1983, 3324849

Int. Cl.[4] A47F *5/08*

U.S. Cl. 211—94 **4 Claims**



1. Mounting means adapted to be attached to a wall for releasably mounting devices therein comprising:

a plurality of first parallel channel-shaped profiled rails having a generally trapezoidal cross-section;

a plurality of second parallel profiled rails having the same channel-shaped trapezoidal cross-section as said first rails extending perpendicularly to and intersecting with said first rails to form an array of mutually crossing rails and channels;

each rail having one of the parallel sides shorter than the other with the shorter side being open and facing away from the wall on which the mounting means is attached to form an entry slot for each channel in each rail into which support fixtures for devices are removably insertable; and

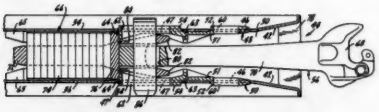
rectangular plate elements of magnetizable material disposed between and connected to said profile rails adjacent said shorter sides.

4,589,558

RAILROAD CAR WITH UNIVERSAL COUPLING CAPABILITY

Rene H. Brodeur, Wilmette, and Boris S. Terlecky, Woodridge, both of Ill., assignors to Trailer Train Company, Chicago, Ill.

Filed Apr. 6, 1984, Ser. No. 597,642
Int. Cl.[4] B61G 9/20
U.S. Cl. 213—50 5 Claims



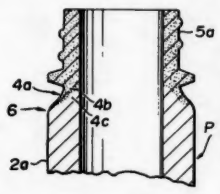
1. A coupling arrangement for a railroad car having a centersill with parallel sidewalls defining a coupler pocket adjacent at least one end of said car, said arrangement comprising opposing will side frames secured to each said sidewall in oppositely facing cooperating relation, each said sill side frame being generally longitudinally elongate in the direction of the longitudinal extent of said centersill and including a frontal draft key slot nearest the end of said car, a rearward draft key slot, inwardly directed stops intermediate said frontal draft key lot and rearward draft key slot and generally aligned with and facing the inwardly directed stop of the opposing sill side frame, and rear webs facing inwardly, disposed rearward of said rearward draft key slot and generally aligned with, and facing the rear webs of the opposing sill side frame.

4,589,559

BLOW-MOLDED BOTTLE-SHAPED CONTAINER OF BIAXIALLY ORIENTED POLYETHYLENE TEREPHTHALATE RESIN AND METHOD OF MOLDING THE SAME

Yoshiaki Hayashi, and Takuzo Takada, both of Tokyo, Japan, assignors to Yoshino Kogyosho Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 593,188, Mar. 27, 1984, abandoned, which is a continuation of Ser. No. 409,176, Aug. 18, 1982, abandoned. This application Sep. 5, 1985, Ser. No. 772,204
Claims priority, application Japan, Aug. 20, 1981, 56-123127[U]; Aug. 27, 1981, 56-134733
Int. Cl.[4] B65D 23/00, 1/02; B29C 49/08, 49/64
U.S. Cl. 215—1 C 6 Claims



5. A hollow blow-molded container of polyethylene terephthalate resin, comprising:

a crystallized neck portion,

a biaxially oriented and uncrystallized body portion, and

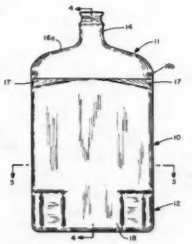
a shoulder portion between said neck and body portions having an upper portion which is crystallized through substantially its entire thickness and a lower portion which is biaxially oriented by blowing an uncrystallized inner layer of a neck root portion of a preform for said container substantially entirely past a crystallized outer layer of the neck root portion.

4,589,560

BOTTLE AND CRATE FOR CONTAINING LIQUIDS

Robert M. Harris, Jr., Reseda, Calif., assignor to McKesson Corporation, San Francisco, Calif.

Filed Sep. 25, 1984, Ser. No. 654,753
Int. Cl.[4] B65D 23/00
U.S. Cl. 215—1 C 2 Claims



1. A bottle for containing liquids in combination with a carrying crate or rack that is square in horizontal section and having bottle engaging structures in its four lower corners, each of said structures comprising a vertical planar wall extending at an angle of 135° to the adjacent side walls of the crate, the bottle comprising, when disposed in vertical position within the crate:

(a) a main body portion having vertical side walls joined on four vertical corners and substantially square in horizontal section;

(b) an upper body portion comprising a neck having an access opening and walls extending radially from the neck and sloped downwardly to the upper edges of the side walls;

(c) a lower body portion forming a portion of the total volumetric capacity of the bottle, said body portion comprising:

1. depending extensions of the side walls, each extension having a horizontal width less than the width of the corresponding side wall of the bottle;

2. vertical lower planar cornerwalls each extending substantially at an angle of 135° to the corresponding side wall extensions, each corner wall having its vertical edges joined to the adjacent vertical edges of adjacent side wall extensions;

3. substantially horizontal planar corner walls at each lower corner of the main body portion having edges joined to the lower corner portions of the side walls of the main body, and also joined to the upper edges of said vertical planar corner walls;

4. a horizontal planar bottom wall having its peripheral edges joined to the lower edges of the depending side wall extensions and the corresponding lower edges of the side walls;

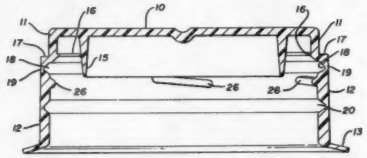
(d) the construction and dimensions being such that the volumetric capacity of the bottle includes the space provided by the main and upper portions and also by the lower portion of the body bounded by the lower side wall extensions and said corner walls, so that when the bottle is disposed within the crate or rack, the corner structures of the crate interfit within the lower corners of the bottle with said vertical walls of the corner structures being parallel to and in close proximity with said vertical walls of the bottle and with said horizontal planar corner walls of the bottle being in proximity with said bottle engaging structures of the crate.

4,589,561

TAMPER-PROOF CLOSURE FOR CONTAINERS

Clem C. Crisci, New Castle, Pa., assignor to Northern Engineering and Plastics Corp., New Castle, Pa.

Filed Jan. 11, 1985, Ser. No. 690,850
Int. Cl.[4] B65D *41/46*
U.S. Cl. 215—256 **3 Claims**



1. An improvement in a resilient molded plastic closure for a container of the type having a neck surrounding an opening to the container and having dual closure, retaining means on the exterior of said neck; said closure comprising means for covering said opening to said container; said improvement comprising a first depending annular flange of a known diameter on said means for covering said opening to said container, said first annular depending flange having a lower edge, oppositely disposed outturned and inturned annular flanges on said lower edge, and a second depending annular flange of a larger diameter than said first depending annular flange on said outturned annular flange, said first and second depending annular flanges surrounding said neck, said inturned flange forming a first means for engaging one of said dual closure retaining means, an annular groove in said second depending annular flange forming a second means for engaging the other one of said dual closure retaining means spaced equally between said oppositely disposed outturned and inturned annular flanges and a lower edge of said second depending flange, an annular frangible wall formed in said second depending annular flange adjacent and below said outturned annular flange, a score line formed in said second depending annular flange and extending from said lower edge thereof to said annular frangible wall to define a tear skirt portion, said tear skirt portion having a pull tab affixed thereto, said dual closure retaining means on the exterior of said neck comprising an annular groove positioned for registry with said inturned annular flange and an annular rib positioned for registry with said annular groove in said second depending annular flange whereby the means for covering said opening to said container, the first depending annular flange, and the oppositely disposed outturned and inturned annular flanges on the lower edge of said first depending annular flange form an annular shoulder outwardly of said neck of said container enabling the same to be readily manually engaged for removing the closure.

4,589,562

STRUCTURES REINFORCED BY A COMPOSITE MATERIAL

Norman C. Fawley, 255 Rafael Walk, Long Beach, Calif. 90803

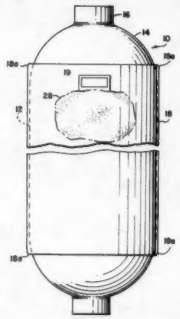
Continuation-in-part of Ser. No. 260,214, May 4, 1981, abandoned. This application Mar. 28, 1984, Ser. No. 594,310
Int. Cl.[4] B65D *8/08;* F16J *12/00;* F16L *9/04;* G01K *11/12*
U.S. Cl. 220—3 **13 Claims**

1. A reinforced structure for containing fluid under pressure, comprising:

an elongated hollow member and a band of continuous, high tensile strength fibers in a resin matrix engaging and encompassing the member, wherein the fibers have a predetermined index of refraction and the resin matrix has an index of refraction substantially equal to the index of refraction of the fibers, whereby the elongated hollow member is visible through the band.

8. A structure for containing fluid under pressure comprising:

an elongated hollow member and means for reinforcing said elongated hollow member, said reinforcing means comprising a reinforcing band extending around and in engagement with said elongated hollow member and including a plurality of high tensile strength fibers and a matrix



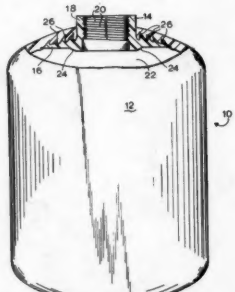
encapsulating said fibers, said matrix comprising a heat indicating material responsive, by changing color, to a temperature above which the strength of said hollow member is substantially weakened, thereby indicating that the structure is unsuitable for use.

4,589,563

HIGH-PRESSURE CONTAINER AND METHOD OF MAKING THE SAME

Gerald W. Born, Eldora, Iowa, assignor to Quality Products, Inc., Eldora, Iowa

Continuation-in-part of Ser. No. 472,580, Mar. 7, 1983, Pat. No. 4,518,558. This application Sep. 10, 1984, Ser. No. 649,076
Int. Cl.[4] B65D *7/42*
U.S. Cl. 220—3 **5 Claims**



1. A high-pressure plastic container comprising:

a neck having a tubular mouth with a longitudinal axis and a disc disposed around said mouth, said disc having an upper surface extending radially away from said axis, with a plurality of upwardly extending rings; and

a blow molded body having a top section coextensive with said disc and engaged by said rings;

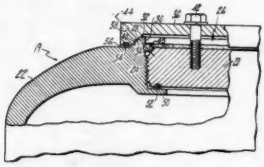
whereby the rings prevent separation between the neck and the body while the container is pressurized.

4,589,564

PRESSURE VESSEL OPENING SEAL

Elliot F. Olster, Orange, and Vance A. Chase, Oxford, both of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Apr. 4, 1985, Ser. No. 720,198
Int. Cl.[4] B65D *41/04, 45/00;* F16J *13/00*
U.S. Cl. 220—3 1 Claim



1. A high pressure vessel (19) having a curved end (22) and an access plug (20) threaded into a hole (26) in the curved end and sealed therein by a weld (45) around the periphery of the access plug, characterized by:

an annular flask lip (29), disposed on the exterior of the vessel around the circumference of the hole, and having an outside edge (34) sloping at an angle away from the hole;

a disc-like cap (36), disposed over the hole (26) extending past the flask lip (28), and having a disc lip (38) sloping towards the flask at an angle corresponding to the angle of the outside edge (34) of the flask lip (28), the disc lip (38) contacting the outside edge (34) of the flask lip (28); and

means (42) for applying a downward force on the cap (36), urging the disc lip (38) against the flask lip (28);

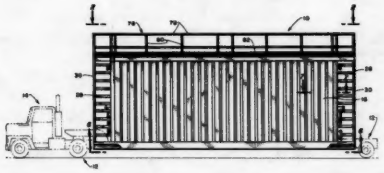
wherein the angle of the outside edge (34) of the flask lip (28) is selected to direct the downward force through the weld in opposition to forces through the weld resulting from pressure within the vessel.

4,589,565

PORTABLE LIQUID STORAGE TANK

Bruce T. Spivey, 320 Encino Dr., Oakview, Calif. 93022

Continuation of Ser. No. 567,732, Jan. 3, 1984, abandoned. This application Mar. 7, 1985, Ser. No. 709,100
Int. Cl.[4] B65D *87/00*
U.S. Cl. 220—71 20 Claims



1. A portable liquid storage tank comprising:

a base supported by reinforcement means including an underlying frame having opposing longitudinal portions connected by transversely extending opposing end frame members with cross members extending between said longitudinal portions and foundation members underlying said cross members extending parallel to said longitudinal portions, said base having opposing end portions extending beyond each of said end frame members;

at least two spaced-apart quadrilateral sidewalls extending vertically from said base a distance greater than about five feet to a top edge;

a least two end walls extending vertically from said end portions outwardly from respective end frame members to a top edge a distance greater than about five feet with the opposing ends of each of said sidewalls being connected by an end wall;

each of said base opposing end portions including an extension extending outwardly from a corresponding end wall wherein at least one of said extensions having attachment means for connection with transporting means; and,

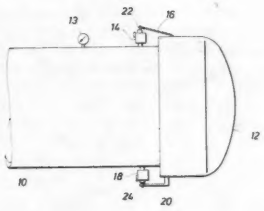
a top wall connected to the top edge of each side wall and end wall to form an enclosed tank with said sidewalls being corrugated with a corrugation spacing to depth ratio of about less than 7:1.

4,589,566

PRESSURE RESPONSIVE SAFETY INTERLOCK

Joe F. Rives, and Forrest L. Carson, both of Borger, Tex., assignors to J. M. Huber Corporation, Locust, N.J.

Filed Apr. 8, 1985, Ser. No. 721,263
Int. Cl.[4] B65D *45/00*
U.S. Cl. 220—316 20 Claims



1. A safety interlock device responsive to fluid pressure within a vessel for preventing unthreading of a vessel cap when said vessel contains a fluid under pressure, said interlock device comprising:

an interlock body having an entrance port for fluid communication with said fluid in said vessel, a piston chamber, and a stem port opposite said entrance port with respect to said piston chamber;

an elongate stem at least partially positionable within and axially removable from said interlock body;

stop means for limiting movement of said vessel cap relative to said stem to prevent unthreading of said vessel cap unless said stem is removed from said interlock body;

a piston movable independent of said stem within said piston chamber and responsive to said fluid pressure for moving from an unlock position to a lock position, said piston having a stem passageway for receiving a portion of said stem;

said interlock body having a fluid passageway for establishing fluid communication between said entrance port and said piston chamber, and a portion of said fluid passageway defining a seating surface;

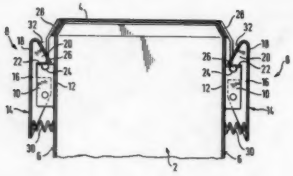
a valve member carried by said stem for sealing engagement with said seating surface for controlling fluid flow through said fluid passageway; and

said stem including a shoulder for engagement with said piston in said lock position to prevent removal of said stem from said body.

4,589,567
CONTAINER AND COVER HAVING RESILIENT FASTENING MEANS

Herbert Pircher, Planegg, Fed. Rep. of Germany, assignor to Buro Patent AG, Glarus, Switzerland

PCT No. PCT/CH84/00195, § 371 Date Jul. 31, 1985, § 102(e) Date Jul. 31, 1985, PCT Pub. No. WO85/02593, PCT Pub. Date Jun. 20, 1985
PCT Filed Dec. 13, 1984, Ser. No. 763,142
Claims priority, application Switzerland, Dec. 15, 1983, 6682/83
Int. Cl.[4] B65D *45/16*
U.S. Cl. 220—326 5 Claims

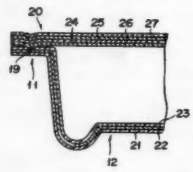


1. In a container, especially for a conveyor system, which comprises a container body closable by a lid, the lid being connected to the container body on one side of the container by a hinge and on the opposite side by means of a snap lock, the lid and body forming respective container sections, the improvement wherein the container has on both of two opposite sides respective container sections and on each side at least one combination snap lock formed as hinge, said snap locks each including on one section of the container a latch formed as part of a hinge and held in closed position by a spring which cooperates manually detachably with another hinge portion on the other container section on the respective side of the container, where the latch and/or the other hinge portion are provided with a ramp surface for the automatic engagement latch and other hinge portion of the respective combination snap lock.

4,589,568
PACKAGE

Hideyuki Ito, Fuji, and Nobuyasu Takanashi, Yamanashi, both of Japan, assignors to Terumo Corp., Tokyo, Japan

Filed Apr. 6, 1984, Ser. No. 597,441
Claims priority, application Japan, Apr. 23, 1983, 58-71992
Int. Cl.[4] B65D *41/00*
U.S. Cl. 220—359 13 Claims

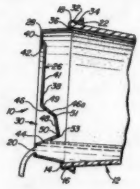


1. A package, comprising:
a sheetlike lid having a hot melt layer;
a tray member on which the hot melt layer of said lid is superposed, wherein said tray member is provided along the edge of a recess opening therein with a sheetlike flange part, and said tray member and said sheetlike lid are heat sealed at said sheetlike flange part, the heat sealed portion formed between said sheetlike flange part of said tray member and said sheetlike lid comprising
at least one primary joined portion having one of said sheetlike parts strongly pressed down and partially buried in the other sheetlike part, and
at least one secondary joined portion adjacent said primary joined portion having said sheetlike parts pressed down less strongly against each other than in said primary joined portion and at least on the inner side of said primary joined portion relative to the tray member in the direction of the cross section of said heat sealed portion for protecting said primary joined portion,
wherein the distance from the edge of the inside surface of the wall of said tray member forming said recess opening, to the inner edge of said primary joined portion is at least 0.5 mm, and the width of said secondary joined portion is in the range of 0.1 to 10 mm.

4,589,569
LID FOR DRINKING CUP

Jack D. Clements, Ada, Okla., assignor to Solo Cup Company, Highland Park, Ill.

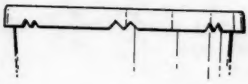
Continuation-in-part of Ser. No. 545,076, Oct. 24, 1983, abandoned. This application Aug. 22, 1984, Ser. No. 643,667
Int. Cl.[4] B65D *41/26, 43/03, 47/06*
U.S. Cl. 220—380 6 Claims



1. A lid for a drinking cup, the lid comprising:
a top wall having a generally circular periphery;
an annular side wall depending from said top wall about its periphery; and
an annular mounting portion at the bottom of said side wall for sealingly engaging the lip of the drinking cup;
said lid having a drinking opening therein adjacent said periphery to enable drinking from the cup without removal of the lid;
said top wall including a recessed portion for receiving the upper lip of a person drinking from the cup; and
said recessed portion having a drain opening formed therethrough to permit liquid to drain from said recessed portion into said drinking cup; said drain opening being separate from said drinking opening.

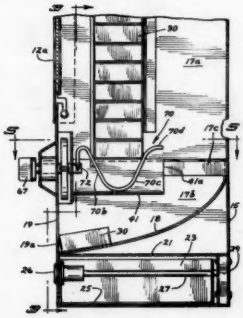
3. A thermoformed plastic lid for a drinking cup, the lid comprising:
a generally horizontal top wall having a generally circular periphery;
an annular side wall depending from said top wall about its periphery; and
an annular mounting portion at the bottom of said side wall for sealingly engaging the lip of the drinking cup;
said top wall having a drinking opening formed therethrough adjacent said periphery, a recess formed therein radially inwardly of said drinking opening for receiving the upper lip of a person drinking from the cup, and a generally horizontal support surface oriented generally parallel to said annular mounting portion;
said recess being defined by a concave surface sloping downward and radially inward adjacent said drinking opening, a first generally planar surface intersecting said concave surface at an arcuate line of intersection and sloping generally upward therefrom, and a second generally planar surface intersecting said first generally planar surface and sloping upward therefrom.

4,589,570
RUBBISH CONTAINER
Howard L. Auten, 30 Curlew Rd., Manapapan, Fla.
Filed Aug. 22, 1984, Ser. No. 643,048
Int. Cl.[4] B65D 25/16
U.S. Cl. 220—404 18 Claims



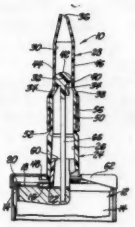
1. A container structure for use with a disposable liner bag, comprising:
a main body portion including an upstanding wall and a base;
a rim extending from said upstanding wall and defining an opening at the upper end of said container structure, said rim terminating in a downwardly directed peripheral edge portion; and
projections extending downwardly from said rim and being substantially coplanar with said peripheral edge portion so as to leave unobstructed space on the underneath side of said rim, between said wall and each projection, said projections positioned to deformably engage the bag causing the material to be forced to an engagement position with the underneath side of said rim as other bag material presses against the upper side of said rim creating a locking action about said rim.

4,589,571
VENDING MACHINE DISPENSING DEVICE
Willard D. Sykes, 5613-152nd St. N., Hugo, Minn. 55038
Filed Jul. 23, 1984, Ser. No. 633,401
Int. Cl.[4] G07F 11/24
U.S. Cl. 221—75 3 Claims



1. A vending machine product dispensing mechanism, having in combination
a housing having an upper chamber having a vertically stacked supply of product therein and a lower chamber for dispensing said product,
supporting means separating said chambers,
means having non-linear horizontal movement supporting said stack of product,
the lowermost unit of said stack of product being seated upon said last mentioned means,
a trough retained by said supporting means,
said second mentioned means comprises a coil member disposed in said trough,
operating means external of said housing having an inward extension operatively engaging said coil member,
said coil member being arranged and constructed that upon rotation the unit of product seated thereupon is caused to advance thereon to become discharged therefrom, and
means in said lower chamber dispensing said unit of product discharged by said coil member.

4,589,572
DISPENSING MECHANISM
Thomas Pomarolli, Farmington Hills, Mich., assignor to New Product Development, Inc., Plymouth, Mich.
Filed Jun. 20, 1983, Ser. No. 506,203
Int. Cl.[4] B67B 7/46
U.S. Cl. 222—83.5 7 Claims



1. A dispensing assembly (10) for dispensing a highly viscous fluid from a container (12) having a sealed dispensing end (18) and an integral part (60) overlying the seal (16), said assembly (10), comprising: a base member (24) including a substantially cylindrical body portion having a first passageway (26) extending therethrough and having a predetermined circumference;
a nozzle member (28) slidably mounted on said base member (24) and having a second passageway (30) in fluid communication with said first passageway (26);
valve means for reversably sealing off fluid flow from said first passageway (26) to said second passageway (30), said valve means including a plug (32) for reversible sealing engagement within said second passageway (30) and including an inner surface, said assembly (10) characterized by said base member (24) including a plurality of spokes (34) extending substantially radially inwardly from said body portion to said plug (32) defining a plurality of openings therebetween for allowing unobstructed forward flow of fluid therethrough; and seal rupturing means for rupturing a seal (16) of the dispensing end of the container (12) within said circumference of said first passageway (26), said seal rupturing means including a post (66) extending from said inner surface of said plug (32) through said first passageway (26) and beyond said body portion whereby said post (66) ruptures the seal (16) within the confines of the first passageway (26) upon insertion of the spout (60) of the container (12) into said first passageway (26) of said base member (24).

4,589,573
HEAD DEPRESSION TYPE DISPENSER
Tetsuya Tada, Tokyo, Japan, assignor to Canyon Corporation, Tokyo, Japan
Filed Sep. 14, 1982, Ser. No. 417,876
Claims priority, application Japan, Jun. 29, 1982, 57-112032
Int. Cl.[4] B65D 47/34
U.S. Cl. 222—153 1 Claim

1. A dispenser adapted to be attached to an opening of a container for dispensing a liquid received in the container, comprising:
a cap removably attachable to said opening of said container and having a through hole extending in an axial direction thereof, said through hole communicating with said opening of said container;
a head which is fitted into one end of said through hole and which is movable in and around the axial direction of said cap, said head having one end which is located outside of said cap and another end which is located inside of said

cap, and said head having a passage which has one end open outside of said cap and another end in said through hole, said head having an outer surface;

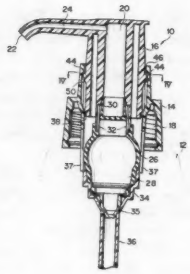
an elastically deformable cylinder which is formed of an elastic material, said cylinder defining an inner space in the form of a chamber, said cylinder being received in said through hole, and said cylinder having one end which is connected to said another end of said passage;

a suction pipe having one end connected to the other end of said cylinder and another end which is positioned in said container;

a primary valve attached to said one end of said suction pipe, and allowing communication between said chamber defined by said cylinder and said container, whereby liquid in said container is sucked up into said chamber when the pressure in said chamber is negative; and

a secondary valve attached to said another end of said head, and allowing communication between said chamber and the outside whereby the liquid in said chamber is dispensed to the outside through said passage when the pressure in said chamber is increased by pressing said head to contract said chamber;

said cap including an inner flange having at least one notch;



said head including at least one external extension piece extending from the outer surface of said head and which is capable of passing through said at least one notch of said inner flange, for allowing relative movement between said cap and said head and preventing said head from moving into said cap unless said at least one external extension piece of said head is aligned with said at least one notch of said inner flange of said cap;

said head further including at least one engaging groove formed on the outer peripheral surface of said at least one external extension piece;

said cap further including at least one engaging projection extending internally of said cap and which, when in engagement with said at least one engaging groove of said head, prevents relative rotation between said head and said cap about the axis of said through hole; and

said at least one engaging groove and said at least one engaging projection being arranged such that they are engagable with one another when said at least one external extension piece of said head is aligned with said at least one notch of said inner flange of said cap or is not aligned with said at least one notch of said inner flange of said cap.

4,589,574

DISPENSING PUMP HAVING COLLAR-TO-BODY ANTI-ROTATION INTERLOCK

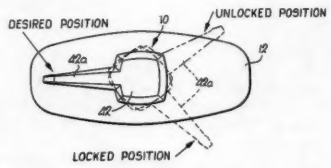
Donald D. Foster, Kingsville, Mo., assignor to Realex Corporation, Kansas City, Mo.

Filed Nov. 30, 1983, Ser. No. 556,420

Int. Cl.[4] B67B *5/00*

U.S. Cl. 222—153 **5 Claims**

1. In a down-locking dispensing pump having a tubular body, a collar at one end of the body provided with means retaining the collar on the body against axial displacement, a plunger reciprocably and rotatably received by the collar and body, and means between the collar and plunger for releasably locking the latter in a fully depressed position relative to the collar, said releasable locking means including a laterally outwardly projecting lug on the plunger adjacent the normally upper end thereof disposed for locking disposition underneath a ledge on the collar when the plunger is fully depressed and rotated in a locking direction relative to the collar, the improvement comprising:



interlocking projection means between said body and the collar for preventing rotation of the latter with the plunger during unlocking rotation of the plunger in a direction opposite to said locking rotation to release said lug from underneath said ledge,

wherein said body including a cylindrical wall said projection means including serrations in said wall at said one end of the body engagable with a portion of the collar.

4,589,575

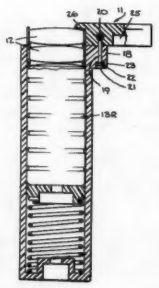
HYGIENIC DISPENSER FOR WAFERS

Allan Rigberg, 300 E. 75th St. (12B), New York, N.Y. 10021, and Jeffrey Lewis, 25 Guyer Rd., Westport, Conn. 06880

Filed Nov. 15, 1983, Ser. No. 552,070

Int. Cl.[4] B65H *1/00*

U.S. Cl. 221—198 **5 Claims**



1. A hygienic dispenser for edible wafers having a predetermined thickness, the wafers being stacked and being sealed within a wrapper to create a roll; the dispenser comprising:

A. a tubular container having an open end to receive the roll;

B. a platform disposed in said container and axially advanceable therein, the roll being seated on the platform;

C. means to advance said platform to push said roll toward the open end of the container;

D. a cap provided at its top with a visor and having a thickness substantially matching said predetermined thickness, said cap being pivoted on said container and being laterally swingable relative to the open end thereof so that the cap may selectively assume a storage mode position in which it closes the open end of the container, a cocked mode position in which the open end is uncovered by the cap but the visor thereof overlies the open end to permit

said platform to push the roll upwardly, thereby projecting the uppermost wrapped wafer above the open end of the container to engage the overlying visor, and an operating mode in which the cocked cap is swung back from its cocked mode position to its storage mode position, in the course of which movement the wrapper is severed by the cap and the uppermost wrapped wafer is discharged laterally from the dispenser; and

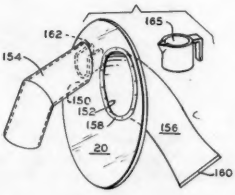
E. stop means cooperating with said cap to limit movement thereof to said mode positions.

4,589,576

DISPENSER FOR SOLID FOODS

Gerard S. Knight, Plymouth; Perry A. Dreyer, Burnsville, and Robert B. Gjelhaug, Brooklyn Center, all of Minn., assignors to Waymouth Farms Inc., Plymouth, Minn.

Filed Aug. 17, 1983, Ser. No. 523,930
Int. Cl.⁴ G01F *11/10*
U.S. Cl. 222—357 **6 Claims**



1. A food storage and dispensing container for food products including nuts, granola, dried fruit and the like, said dispensing container comprising

(a) a container body having a bottom wall and side walls terminating in an open wide mouth and being adapted to be used with the mouth to one side such that the side walls and central axis of the container are oriented other than in a vertical position,

(b) a removable cover plate formed from a sheet of rigid transparent material extending across and sealing the open wide mouth of the container and adapted to be withdrawn for refilling the container with the food product,

(c) said removable cover plate having first and second side-by-side spaced apart openings therein;

(d) a dispenser spout depending downwardly during use on the outside of the cover plate, the spout being connected to the cover plate around the edge of the first opening and communicating therethrough with the interior of the container for conveying the food product out of the container,

(e) said second opening in the cover plate comprising a hand hole,

(f) a flexible tube sealed at its outer edge around the edge of the hand hole and extending into the container from the hand hole,

(g) said flexible tube having a free end within the container and the free end of the tube being closed,

(h) the spacing between the first and second openings being within the reach of a hand placed into the flexible tube whereby a person's hand can be placed in the tube to grasp the product in the container and the flexible tube moved manually to a position in proximity with the dispensing spout to permit manual dispensing of a food product from the container to the spout,

(i) the spout and tube being removed simultaneously from the container when the cover is removed and,

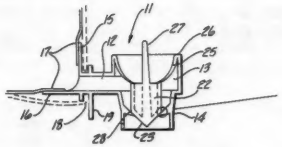
(j) said spout terminating in an outlet nozzel at its free end through which the product is dispensed from the container.

4,589,577

DISPENSER CLOSURE

William C. Welsh, and Peter W. Welsh, both of Lot 400, Range Road, Herne Hill, Western Australia, Australia

PCT No. PCT/AU83/00057, § 371 Date Dec. 19, 1983, § 102(e) Date Dec. 19, 1983, PCT Pub. No. WO83/04082, PCT Pub. Date Nov. 24, 1983
PCT Filed May 9, 1983, Ser. No. 568,186
Claims priority, application Australia, May 7, 1982, PF3918; Feb. 1, 1983, PF7837; Mar. 16, 1983, PF8469
Int. Cl.⁴ B67D *3/00*
U.S. Cl. 222—518 **16 Claims**



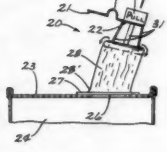
1. A dispenser closure comprising a spout having an outlet defined by a valve seat located within the spout, a flexible diaphragm defining a wall of the spout in opposed relation to the internal face of the valve seat and concave on the side of the spout facing away from said valve seat and convex on the side of said diaphragm facing toward said valve seat, a valve member affixed to and projecting from the inner convex face of the diaphragm into engagement with the valve seat whereby the diaphragm urges the valve member into closing engagement with the valve seat, the outer end of the valve member engaging the valve seat having a convergent configuration, a tab projecting from the outer concave face of said diaphragm for facilitating manual deformation of the diaphragm to lift said valve member from said valve seat and a set of inwardly directed vanes formed in said outlet surrounding the valve seat adjacent the internal face thereof for precluding turbulence in the flow through said valve seat.

4,589,578

CONTAINER WITH IMPROVED DISPOSABLE POURING SPOUT

Patrick K. Hayward, THP Box 1138, Fairfield, Iowa 52556

Filed Mar. 7, 1984, Ser. No. 587,078
Int. Cl.⁴ B65D *47/10, 5/72*
U.S. Cl. 222—529 **1 Claim**



1. A spout device for use with containers having a lid with a rupturable unit for providing a rupturable opening therein, the spout device comprising:

circular base means having an opening therein and adapted to be adhered to the lid with said opening directly above the rupturable opening;

spout means extendable from a compact circular condition on said base means and above the rupturable opening to an elongated, tubular condition, one end of said spout means affixed to said circular base means such that the interior of

said spout means is in fluid communication with said opening; and

pull-tab means detachably affixed to said spout means at an end thereof opposite said one end, said pull-tab means further adapted to be affixed to the rupturable unit, said pull-tab tab means comprising a tab connected to a plurality of straps, said straps connected to said spout means, whereby as said tab is manipulated away from the lid, both the rupturable unit and said straps are also pulled away from the lid thereby expanding said spout means.

4,589,579

TONER VESSEL FOR COPYING MACHINE

Yoshiharu Morita, Numazu, Japan, assignor to Ricoh Co., Ltd., Tokyo, Japan

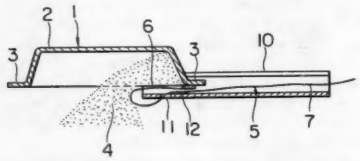
Filed May 1, 1984, Ser. No. 606,071

Claims priority, application Japan, May 18, 1983, 58-74120[U]

The portion of the term of this patent subsequent to Mar. 4, 2003, has been disclaimed.

Int. Cl.⁴ B65D *47/00*; B67D *3/00*

U.S. Cl. 222—561 **3 Claims**



1. A toner vessel for use in a copying machine including: a sqaure dish-shaped vessel body which has an opening at its upper part and is provided with an outwardly projecting flange at the peripheral edge of said opening, said vessel receiving the toner therein; a reversely folded cover sheet having an upper part and a lower part, said opening of said vessel body being openably covered with said lower part of said cover sheet, said lower part having a peripheral edge adhered to said outwardly projecting flange; a cover plate which covers said lower part of said cover sheet and is mounted on said vessel body for movement in the horizontal direction; said cover plate having a slit located at the portion of said cover plate near the folded portion of said cover sheet; said upper part of said cover sheet extending through said slit and thence along the back of said cover plate, the improvement which comprises: a projection being provided on the back of said cover plate adjacent to said slit for removing the toner that adheres to the cover sheet, said projection being located on the side of said slit in the direction in which said cover sheet is advanced when said opening is uncovered, said projection slidably contacting the back of said cover sheet.

4,589,580

WEB HANDLING AND ACCUMULATION SYSTEM

William O. Young, Jr.; Julian E. Hankinson, Jr., both of Spartanburg, and Mansel A. Jennings, Inman, all of S.C., assignors to Young Engineering, Inc., Spartanburg, S.C.

Filed Jan. 23, 1985, Ser. No. 693,968

Int. Cl.⁴ B65H *20/28*

U.S. Cl. 226—119 **28 Claims**

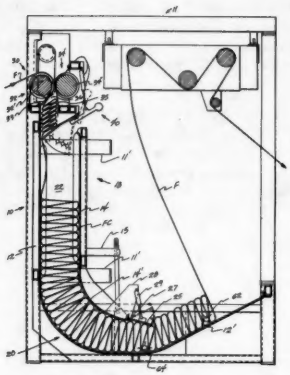
1. Improved fabric accumulation apparatus comprising:

(a) fabric feed means;

(b) a housing, said housing having sidewalls defining a vertical fabric storage section, said housing defining a fabric entrance at an upper end thereof and a fabric exit at a lower end thereof whereby fabric may be accumulated in said storage section while awaiting being fed from said fabric exit;

(c) closure means associated with said housing between said feed means and said fabric storage section said closure means being adapted for movement between an open position where fabric may pass thereby and a closed position which defines a fabric packing section therabove; and

(d) control means operatively associated with said closure means to move said closure means between said open and



said closed positions, whereby when said closure means is in said closed position, fabric fed into said housing is compacted in said packing section, and whereby at predetermined intervals, said closure means will open, permitting said compacted fabric to drop thereby into said fabric storage section of said housing, and reclose.

4,589,581

ELECTROMECHANICAL DEVICE FOR AUTOMATING THE OPERATION OF TABLE STAPLERS

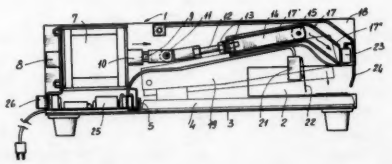
Giorgio Balma, Voghera, Italy, assignor to Balma, Capoduri & C., S.p.A., Voghera, Italy

Filed Jul. 11, 1984, Ser. No. 629,719

Claims priority, application Italy, Jul. 13, 1983, 22054 A/83

Int. Cl.⁴ B25C *5/02, 7/00*

U.S. Cl. 227—7 **3 Claims**



1. An electromechanical device for use with a stapler having a movable arm, a fixed arm and a die on said fixed arm, said stapler being operable, when said movable arm is moved toward said fixed arm, to eject a staple and bend the ends of the staple against said die, said device comprising

a box-like body for housing and restraining a stapler, said body being of elongated parallelpipedal shape and having side walls provided at one end with a horizontally extending slot, and a bottom wall having a width related to that of the fixed arm of the stapler and having ridges extending therefrom for longitudinally restraining said fixed arm;

an electromagnet in said box-like body at the end thereof opposite that of said slots, said electromagnet having a casing and an armature projecting from said casing;

a spindle affixed to said armature;

a pad of elastomeric material coaxially affixed to said spindle;

a threaded stem;

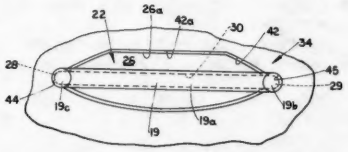
a cylindrical coupling device coupling said stem to said spindle;
a fork member mounted on said stem and having legs;
a roller supported by the legs of said fork member, said roller having an axis;
two small wheels rotatably affixed to said roller at the spaced opposite ends of its axis outside said legs of said fork;
a pair of guides formed cantilever-wise on the inner surfaces of the side walls of said box-like body, each of said guides having a first portion slightly upwardly slanted and a second portion slanted downwardly at a greater angle than said first portion, said wheels being rotatably constrained in corresponding ones of said guides;
an energizing circuit for said electromagnet;
a microswitch in said energizing circuit for controlling said circuit; and
a lever engageable with the edges of stacked sheets to be stapled for controlling said microswitch and thereby said circuit.

4,589,582

CARTRIDGE AND DRIVER ASSEMBLY FOR A SURGICAL STAPLING INSTRUMENT

Federico Bilotti, Madeira, Ohio, assignor to Senmed, Inc., Cincinnati, Ohio

Filed Aug. 23, 1984, Ser. No. 643,803
Int. Cl.[4] A61B *17/00*
U.S. Cl. 227—19 **12 Claims**



1. An improved staple-containing cartridge and driver assembly for a surgical stapling instrument for use with conventional U-shaped surgical staples having a crown portion and downwardly depending legs, said instrument being of the type having driver actuating means and an anvil opposed to said cartridge and which, when the driver actuating means is operated, a plurality of staples are driven from said cartridge through tissue to be joined and against said anvil to form said staples, said cartridge having a forming pocket for each staple, each of said forming pockets is of elongated transverse cross-section of substantially biconvex configuration terminating in ends adapted to frictionally receive and retain the legs of a surgical staple, a driver comprising an elongated tine for each forming pocket, each tine being shiftable in its respective forming pocket to drive said staple therefrom, each driver tine having an elongated substantially biconvex transverse cross-sectional configuration closely matching that of its respective forming pocket, each driver tine being configured to engage the crown portion of its respective staple including those portions of said crown above said staple legs.

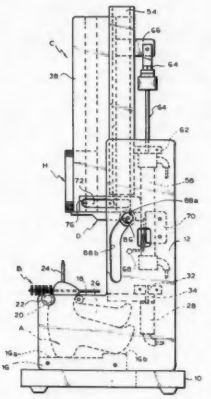
4,589,583

AUTOMATIC HOOK ATTACHING APPARATUS

Steven J. Kunreuther, New York, N.Y., and John T. Roberts, Clover, S.C., assignors to Kunreuther and Beringhause, Carle Place, N.Y.

Filed Aug. 20, 1984, Ser. No. 642,403
Int. Cl.[4] B27F *7/02*
U.S. Cl. 227—43 **19 Claims**

9. Apparatus for attaching a hook or the like to an article, the hook being of the type having an aperture therein, said apparatus comprising a base with a fixed member, means on said base for fixedly mounting a fastener attacher of the type having a hollow needle through which fasteners are dispensed in response to the actuation of the attacher, means for actuating the attacher, means for retaining a stack of hooks, means movably mounted on said retaining means for dispensing hooks, one at a time, from said retaining means, means for mounting said retaining means and said dispensing means for movement, as a unit, relative to said fixed member, in a first direction, said until



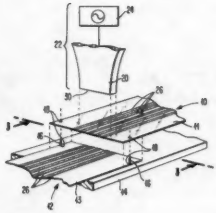
mounting means comprising means cooperating with said fixed member for displacing said dispensing means in a second direction relative to said retaining means between a first position wherein a dispensed hook is out of alignment with the needle, and a second position wherein the dispensed hook is in alignment with the needle, in response to the movement of said unit in said first direction, and means for moving said unit in said first direction.

4,589,584

ELECTRICAL CONNECTION FOR POLYMERIC CONDUCTIVE MATERIAL

Robert A. Christiansen, Salvisa; Frank M. Rose, Jr., Nicholasville; James R. Smith, Cynthiana, and Kenneth D. Woosley, Winchester, all of Ky., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 31, 1985, Ser. No. 696,821
Int. Cl.[4] B23K *20/10*
U.S. Cl. 228—110 **10 Claims**



1. The method of joining electrical conductor assemblies comprising electrical conductors of a thermally deformable conductive material carried upon thermally bondable substrates, said method comprising the steps of

placing one conductor assembly in face to face engagement with a second conductor assembly with said conductors in contacting relation,

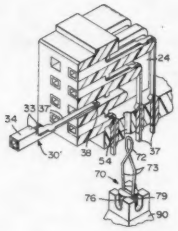
supporting said plurality of assemblies;
engaging said plurality of assemblies in such a manner as to exert a force against said assemblies;
applying a high frequency vibratory energy to said assemblies to create localized heating at interfaces between said assemblies;
fusing said substrates in regions not covered by said conductors and subsequent thereto;
fusing said conductors.

4,589,585

METHOD FOR REPLACING CONTACT IN A BOARD MOUNTED CONNECTOR

Alden O. Long, Jr., Carlisle, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Sep. 23, 1985, Ser. No. 779,015
Int. Cl.[4] B23K *31/02*; H05K *3/34*
U.S. Cl. 228—119 **1 Claim**



1. A method for replacing a contact in an electrical connector fixed to a printed circuit board, said connector being of the type having a mating face, a board mounting face at a right angle thereto, and a plurality of contact receiving passages extending therebetween, said passages having therein respective stamped and formed electrical contacts each comprising a socket at said mating face, a solder tail extending from said mounting face, and a right angle bend therebetween, said tails being soldered in respective plated through holes in said circuit board, said method comprising the following steps
desoldering the tail of the contact to be replaced,
extracting said contact from the mating face,
inserting loop means through the plated through hole vacated by said contact and into the respective vacated passage,
inserting the tail of a replacement contact into said vacated passage from said mating face, said replacement contact being straight and having a hook formed on the end of said tail, said hook being received in said loop means,
pulling said loop means and said tail of said replacement contact through said plated through hole, said socket being pulled into said mating face.

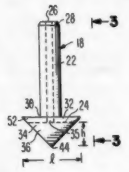
4,589,586

COLLET FOR DIE BONDING

Carl Polansky, Landisville, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed Aug. 29, 1985, Ser. No. 770,568
Int. Cl.[4] B23K *31/02*
U.S. Cl. 228—179 **5 Claims**

1. A collet for simultaneously holding and oscillating a semiconductor die on the surface of a mounting member during die bonding;
said collet being an integral member comprised of a shank portion and a die holder portion;
said shank portion being adapted for cooperative engagement with a die bonder and having first and second terminal ends with a vacuum conduit means extending from the first terminal end to the second terminal end;
said die holder portion being formed at the second terminal end of the shank portion and consisting of an upper wall having a flat inner surface and an aperture defined therein in communication with the vacuum conduit means;
said die holder portion further consisting of a pair of opposing spaced-apart triangular-shaped walls having flat inner



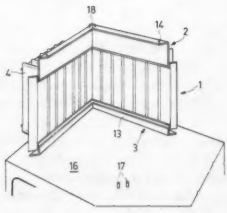
surfaces and extending perpendicularly from the upper wall with the respective apexes of the triangular-shaped walls extending away from the upper wall, and said inner surfaces of said walls in combination defining an open ended internal receptacle for receiving said semiconductor die.

4,589,587

PROCESS FOR PRODUCING A TANK, PARTICULARLY FOR TRANSFORMERS

Walter Kanis, Unterlauchringen, Fed. Rep. of Germany, assignor to Zschokke Wartmann AG, Brugg, Switzerland

PCT No. PCT/CH83/00048, § 371 Date Dec. 20, 1983, § 102(e) Date Dec. 20, 1983, PCT Pub. No. WO83/03921, PCT Pub. Date Nov. 10, 1983
PCT Filed Apr. 21, 1983, Ser. No. 567,401
Claims priority, application Switzerland, Apr. 30, 1982, 2665/82
Int. Cl.[4] B23K *31/02*
U.S. Cl. 228—183 **2 Claims**



1. A process for producing a tank, comprising the steps of:
prefabricating a plurality of wall parts, each of the wall parts including a rib element having a base member with a plurality of elongated ribs extending outwardly from a first lateral surface thereof and a generally smooth second lateral surface opposite to the first lateral surface, the base member having end edges generally parallel to the ribs and lateral edges generally perpendicular to the ribs, reinforcement bars fixed to free ends of the ribs, flat strips fixed to the second lateral side along the lateral edges with each of the flat strips having a side edge flush with one of the lateral edges, a side wall directly welded to and carried by one of the flat strips, a frame part directly welded to and carried by the other flat strip, the side wall and the frame part having flanges extending generally perpendicular to the second lateral surface, the flanges having positioning bores;
supporting the wall parts on an assembly plate with the frame part flange contacting the assembly plate and with the positioning holes in the frame part flange receiving

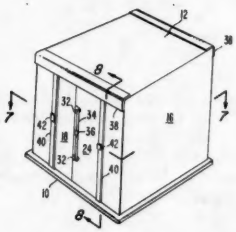
bolts fixedly secured and extending upwardly from the assembly plate to relatively position the wall parts;
placing stirrups in the side wall flange holes of adjacent wall parts to hold adjacent wall parts together; and
welding the wall parts together.

4,589,588

COLLAPSIBLE, REUSABLE SHIPPING CONTAINER

David E. Swanhart, Trenton, N.J., assignor to Trent Box Manufacturing Co., Inc., Trenton, N.J.

Filed Oct. 5, 1984, Ser. No. 658,011
Int. Cl.[4] B65D *5/02, 88/10*
U.S. Cl. 229—41 R **14 Claims**



1. A collapsible container comprising:
(a) a box-like structure having open ends and including
(1) a base forming a bottom wall,
(2) first and second side walls extending from the base, and
(3) a top wall connected between the side walls;
(b) first doors on the respective side walls at opposite ends of the structure swingable between collapsed positions in which they are substantially flattened against the respective side walls and use positions in which they extend across the ends of the structure;
(c) second doors on the respective side walls at opposite ends of the structure swingable between collapsed positions in which they are substantially flattened against the respective side walls and use positions in which they extend across the ends of the structure; and
(d) means for connecting one of the first doors to one of the second doors, and the other first door to the other second door, in the collapsed positions of the doors, and for connecting said one first door to said other second door, and said other first door to said one second door, in the use position of the several doors, said connecting means comprising straps carried by the first doors, the second doors having slots formed with open ends for receiving said straps and so positioned that the strap of each first door enters the slots of first one end then the other of the second doors, in the collapsed and use positions, respectively of the doors.

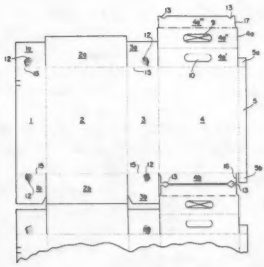
4,589,589

FOLDING BOX BLANK

Willi Grassner, Langenfeld, Fed. Rep. of Germany, assignor to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Jun. 20, 1984, Ser. No. 622,418
Claims priority, application Fed. Rep. of Germany, Jun. 22, 1983, 3322438
Int. Cl.[4] B65D *5/46, 5/28*
U.S. Cl. 229—52 B **18 Claims**

1. A folding box blank comprising
a narrow rectangular first side wall, with an upper first side flap separated therefrom by a fold line and a lower first side flap separated therefrom by a fold line;
a rectangular front wall of the same height as said first side wall and separated from said first side wall by a fold line, with an upper front wall flap separated therefrom by a fold line and a lower front wall flap separated therefrom by a fold line;
a narrow rectangular second side wall of substantially the same dimensions as said first side wall and separated from said front wall by a fold line, with an upper second side flap separated therefrom by a fold line and a lower second side flap separated therefrom by a fold line;
a rectangular back wall of substantially the same dimensions as said front wall and separated from said second side wall by a fold line, with an upper integral carrying handle flap separated therefrom by a fold line and a lower back wall flap separated therefrom by a fold line; and
a gluing strip of substantially the same height as said walls and separated from said back wall by a fold line, with a short upper gluing strip flap separated therefrom by a fold line and a short lower gluing strip flap separated therefrom by a fold line;
wherein: said carrying handle flap itself comprises three parallel segments which are
a handle inner segment separated from said back wall by a fold line, having a centrally positioned griphole means,



the height of said segment being about 0.4 to 0.8 times the width of said side walls and the width being equal to the width of said back wall,
a handle middle segment separated from said handle inner segment by a fold line, having centrally positioned griphole means, the height of said segment being substantially identical to that of said inner handle segment and the width being equal to the width of said back wall, and
a handle outer segment demarked from said handle inner segment by a reverse fold line, the height of said segment being about 0.25 to 0.4 times the width of said side walls and the width less than that of said back wall;
and wherein further:
each of said four side wall flaps has a relief embossing which affords a raised portion on its outer surface when the box is assembled; and a pair of complementary shaped cutouts are on the top edge of one of the remaining upper flaps other than the glue strip flap and a pair of complementary shaped cutouts are on the bottom edge of one of the remaining lower flaps other than the glue strip flap; so that when said box is assembled, the cutouts interact with the embossings by biasing against them.

4,589,590

INTEGRAL MULTIPLE USE MESSAGE UNIT PACKAGE AND METHOD OF MAKING IT

Thomas L. McGuire, 116 W. Carmel Valley, and Robert M. Steinberg, 96 Quien Sabe, both of Carmel Valley, Calif. 93924

Continuation-in-part of Ser. No. 471,481, Mar. 2, 1983, abandoned. This application Dec. 12, 1984, Ser. No. 680,662
Int. Cl.[4] B42D *15/02*
U.S. Cl. 229—92.8 **28 Claims**

1. An integral multiple use message unit package comprising a singular display surface; a plurality of individual message

units behind said display surface and having respective edges aligned substantially with one another and with the display surface; means for intermittently binding the message units to each other along a periphery thereof, thereby maintaining the

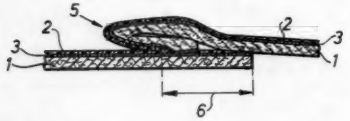
integrity of said message unit package during mailing; and indexing means on said package for convenient selection of one or more desired message units and removal of the desired message unit from the multiple use message unit package without compromising the integrity of the remaining package.

4,589,591

JOINT ON PACKING CONTAINERS AND A METHOD AND ARRANGEMENT FOR THE MANUFACTURE OF THE SAME

Uno Sjöstrand, Flyinge, and Sven Andersson, Åkarp, both of Sweden, assignors to Tetra Pak International AB, Lund, Sweden

Filed Nov. 18, 1983, Ser. No. 552,921
Claims priority, application Sweden, Nov. 24, 1982, 8206680
Int. Cl.[4] B65D *5/42*
U.S. Cl. 229—48 SA **9 Claims**



1. In gas-tight packing coontainers of flexible material of the type having a thermoplastic layer wherein first and second edge regions overlap one another, the improvement comprising a joint having said first edge region doubled upon itself along a first distance extending from a folded edge with said thermoplastic layer of said first edge region overlapping the thermoplastic layer of said second edge region, said joint having a sealing zone where said first and second edge regions are thermally sealed to one another, said sealing zone being spaced a second distance from said folded edge less than said first distance, and an unsealed zone where said first and second edge regions are disconnected from one another, said unsealed zone extending from said folded edge to said sealing zone, whereby upon flexing of said joint said second edge region may undergo displacement away from said folded edge so as to avoid concentration of stress at said folded edge.

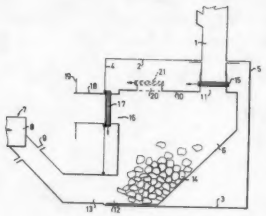
4,589,592

GARBAGE CONTAINER TO BE EMPTIED WITH THE AID OF VACUUM

Lars A. Wassdahl, Spelmansvägen 12, S-79400 Orsa, Sweden

Filed Apr. 17, 1984, Ser. No. 601,343
Claims priority, application Sweden, May 31, 1983, 8303067
Int. Cl.[4] B65G *53/24*
U.S. Cl. 232—43.1 **6 Claims**

5. A garbage container for placement in a garbage room in a building, the container being of the type to be emptied by evacuation, the container having a garbage inlet opening with a sealable valve connected to a garbage chute, a garbage discharge opening connected to a transport duct which is connectable to a garbage truck collection chamber, the collection chamber being capable of being evacuated to produce a suction in the transport duct and to evacuate the conainer when the latter is connected to the collection chamber, the container



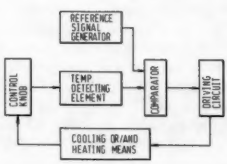
having a bottom portion disposed below the garbage inlet opening and being inclined downwardly toward the garbage discharge opening, and means for closing said valve during evacuation of the container and for subsequently opening an ambient air valve so that garbage is drawn from the container through the transport duct.

4,589,593

DEVICE FOR CONTROLLING TEMPERATURE OF SWITCH KNOB

Seiji Ishikawa, Toyota, and Masanori Hirose, Okazaki, both of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan

Filed May 17, 1985, Ser. No. 735,064
Claims priority, application Japan, May 17, 1984, 59-99386
Int. Cl.[4] G05D *23/00*
U.S. Cl. 236—94 **10 Claims**



1. A device for controlling temperature of control knob of a switch for controlling temperature, comprising:

a temperature detecting element for detecting temperature of said control knob;

a reference signal generator for generating a reference signal in association with preset temperature of said control knob;

a comparator for each comparing an output from said temperature detecting element with a reference signal from the reference signal generator;

a driving circuit actuated in response to an output from said comparator; and

at least cooling or/and heating means actuated in response to an output from said driving circuit, for holding said control knob at the preset temperature.

4,589,594

THRUST NOZZLE SYSTEM

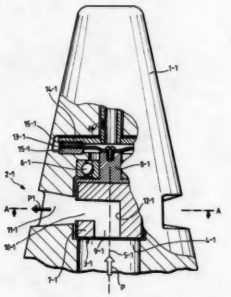
Walter Kranz, Taufkirchen, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung, Munich, Fed. Rep. of Germany

Filed Apr. 30, 1984, Ser. No. 605,286

Claims priority, application Fed. Rep. of Germany, May 13, 1983, 3317583

Int. Cl.[4] F42B *15/033*

U.S. Cl. 239—265.25 10 Claims



1. In a thrust nozzle system wherein a rotatable jet deflector nozzle body having a longitudinal axis and at least one thrust nozzle is supported for rotation in a housing having at least one exhaust port arranged for cooperation with said thrust nozzle of said jet deflector nozzle body, wherein a propellant source provides a gas flow through said jet deflector nozzle body, and wherein means are provided for controlling the rotation of said jet deflector nozzle body, the improvement comprising means for constantly supplying said gas flow to said jet deflector nozzle body for continuously rotating said jet deflector nozzle body, and wherein said means for controlling comprise a braking device (13, 14, 15) operatively interposed between said jet deflector nozzle body (3) and said housing for stopping the rotation of said jet deflector nozzle body independently of said gas flow, said thrust nozzle having an inlet channel extending substantially in parallel to said longitudinal axis (5) about which said jet deflector nozzle body is rotatable, and a nozzle outlet channel extending approximately perpendicularly to said inlet channel, said nozzle outlet channel extending along a chord spaced from said longitudinal axis, whereby a thrust jet out of said nozzle outlet channel reacts against a rear wall in said jet deflector nozzle body.

4,589,595

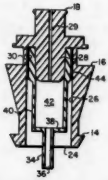
PRESSURE COMPENSATED EMITTER

Glenn G. Havens, deceased, late of La Mesa, Calif. (by Florine P. Havens, Richard C. Thompson, executors), assignor to Havens International, Inc., San Diego, Calif.

Continuation-in-part of Ser. No. 251,180, Apr. 6, 1981, abandoned. This application Feb. 21, 1984, Ser. No. 581,688

Int. Cl.[4] B05B *1/02, 1/30*

U.S. Cl. 239—271 6 Claims



1. A two-stage liquid flow regulator for maintaining a predetermined, substantially constant fluid flow rate over a wider pressure range than either stage independently comprising:

first stage regulation means having a first stage response range from zero to a second higher pressure such that as fluid source pressure varies from zero to a first pressure between zero and said second higher pressure, the flow rate increases from zero to a maximum flow rate and as fluid source pressure varies from said first pressure to said second higher pressure, said maximum flow rate is substantially maintained comprising:

a first elastic tubular member having an inlet end, an outlet end, and a tear-dropped shaped bore therebetween; and

second stage regulation means connected to the outlet end of said first stage regulating means having a second stage response range overlapping said first stage response range from a fluid pressure between said first pressure and said second pressure to a third pressure greater than the first stage response range for substantially maintaining the same predetermined maximum fluid flow rate over the second stage response range wherein said second stage regulation means comprises: a second elastic tubular member having an inlet end connected to said outlet end of said first tubular member, an outlet end, and a bore therebetween, said bore of said second tubular member is cylindrical in cross-section and collapses to double teardrop configuration between said first and second pressures.

4,589,596

NOZZLE FOR INTERNAL COMBUSTION ENGINES

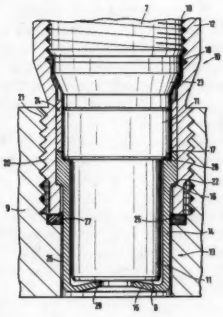
Gerhard Stumpp, Stuttgart; Karl Hofmann, Remseck; Jürgen Treiber, and Horst Wellein, both of Bamberg, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Dec. 29, 1980, Ser. No. 220,665

Claims priority, application Fed. Rep. of Germany, Jan. 3, 1980, 3000061

Int. Cl.[4] B05B *15/00*

U.S. Cl. 239—397.5 13 Claims



1. A fuel injection nozzle for use in a recessed bore of a cylinder head of an internal combustion engine comprising a nozzle body, a threaded nut means including inner and outer surfaces for securing said nozzle body in said recessed bore of said cylinder head, said threaded nut means including outer threads along one end portion of said outer surface for threading into said cylinder head and inner threads along one end portion of said inner surface; said threaded nut means including a shoulder on its inner surface in an area opposite said threads on said outer surface, a heat insulative sheath which is arranged to receive one end of said nozzle body in said cylinder head, said sheath including an axially extending annular lip end portion having an axially aligned aperture therein and an upper end having a radially outwardly extending shoulder portion, a holder body in axial alignment with said nozzle body, said holder body having a threaded portion on its outer surface for

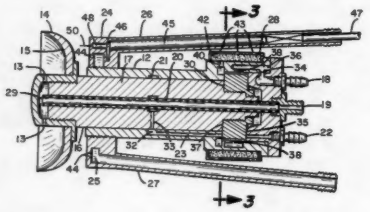
threading into said inner threaded end portion of said threaded means to hold said nozzle body in said threaded means, said shoulder on the inner surface of said threaded nut means being compatible with said radial outwardly extending portion of said sheath for removing said sheath from said cylinder head as said threaded means is removed to remove said nozzle body from said cylinder head.

4,589,597

ROTARY ATOMIZER SPRAY PAINTING DEVICE

Herman Robisch, Des Plaines, and Arthur T. Kroll, Oak Park, both of Ill., assignors to Graco Inc., Minneapolis, Minn.

Filed Oct. 3, 1983, Ser. No. 538,204
Int. Cl.[4] B05B *5/04*
U.S. Cl. 239—703 **5 Claims**



1. A rotary spray atomizer adapted to receive liquid paints and the like and to distribute atomized particles of such liquids under the influence of electrostatic forces, comprising

(a) a housing made entirely from nonconductive material and having an interior recess therein;

(b) a rotatable rotor made entirely from nonconductive material rotatably mounted in said recess along an axis and having an opening therethrough along said axis; said rotor and said housing having an annular space therebetween;

(c) a nonconductive dish-shaped member fixedly attached to said rotor and projecting outside said housing;

(d) a feed tube made entirely from nonconductive material, fixedly attached to said housing and extending through said rotor axial opening, said tube having a first opening proximate said dish-shaped member and a second opening outside said housing; said feed tube and said rotor having an annular space therebetween;

(e) a turbine member made entirely from nonconductive material, fixedly attached to said rotor in said housing recess, said turbine member having a plurality of projecting blades thereon;

(f) one or more conductive electrodes projecting external of said housing proximate said dish-shaped member, and means for applying a high voltage to said electrodes;

(g) means for delivering pressurized air against said turbine member blades in said housing, and means for exhausting air from said housing;

(h) means, including passages in said housing, for delivering pressurized air to said annular space between said housing and said rotor and to said annular space between said rotor and said feed tube.

4,589,598

APPARATUS FOR CONTROLLING A VARIABLE SPEED GEARMOTOR

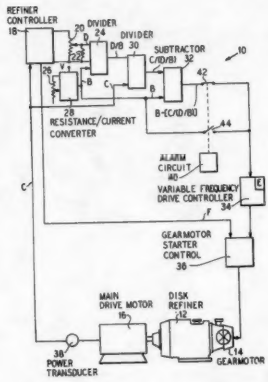
John M. Ellery, Sr., Pittsfield, Mass., assignor to Beloit Corporation, Beloit, Wis.

Filed Oct. 12, 1984, Ser. No. 660,522
Int. Cl.[4] B02C *7/14*
U.S. Cl. 241—37 **8 Claims**

1. Apparatus for controlling operation of a refiner which is driven by a main motor having a predetermined available power and which has disks whose separation is controlled by a variable speed auxiliary motor having a predetermined maximum speed and which disks may be operated in two directions, said apparatus comprising:

first means for producing; a first signal value representing the available power of the main motor, a second signal value representing the maximum speed of the auxiliary motor and a third signal value representing a quantity which is equal to the first signal value divided by the second signal value;

second means connected to the main motor for producing a fourth signal value representing actual main motor power;



third means connected to said first and second means for producing, in response to the third and fourth signal values, a fifth signal value representing a quanity of the fourth signal value divided by the third signal value;

fourth means connected to said first and third means for producing a sixth signal value having a magnitude representing a quanity which is equal to the fifth signal value substracted from the second signal value; and

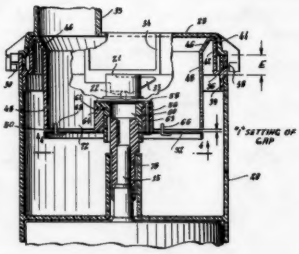
fifth means connected to said fourth means and to the auxiliary motor for driving the auxiliary motor in accordance with the magnitude of the sixth signal value.

4,589,599

ICE CHOPPER APPARATUS FOR PRODUCING ICE PARTICLES OF CONTROLLED SIZE

James E. Williams, Stamford, Conn., assignor to Cuisinarts, Inc., Greenwich, Conn.

Filed Oct. 20, 1983, Ser. No. 543,766
Int. Cl.[4] B02C *19/12*
U.S. Cl. 241—37.5 **5 Claims**



1. Ice chopping apparatus for processing ice chunks to produce ice fragments of controlled size in an electrical appliance having a motor drive comprising:

a working bowl having a cover with a feedtube removably mounted thereon,

a rotary drive which extends up into said bowl and is driven by the motor drive of said appliance,

a rotary ice chopper tool having a disc-like upper surface with at least one ice-chopping blade protruding upwardly therefrom, said tool mountable in said bowl to be driven by said rotary drive,

an annular channel member having an annular shelf and a down turned annular skirt for positioning said annular channel member on the top of said bowl between said cover and said bowl, said annular shelf resting on top of said bowl and said down turned skirt resting annularly on said bowl when said annular channel member is mounted on said bowl,

a downwardly extending cylindrical skirt on said annular channel member which extends down into said bowl to a level above the periphery of said disc-like upper surface for directing ice fed down through said feedtube on said cover into the channel formed by said cylindrical skirt to said disc-like upper surface,

said disc-like upper surface and said cylindrical skirt forming a uniform annular escape gap of predetermined size extending around above the periphery of said disc-like upper surface of said ice-chopping tool, thereby permitting ice fragments which have been reduced at least to the predetermined size of said uniform escape gap to pass through said gap to be deposited into said bowl, and

said rotary ice chopper tool has a removable disc-shaped head with a socket on the underside thereof and a removable shank having a first end adapted to be coupled to the rotary drive and having a second end adapted to be positioned in said socket, and means in said socket for varying the depth of penetration of said second end of said shank into said socket for thereby varying the level of said disc-like upper surface of said rotary ice chopper tool relative to said cylindrical skirt for adjusting the size of the annular escape gap of said apparatus for adjusting the size of the ice fragments to be deposited into the bowl.

4,589,600

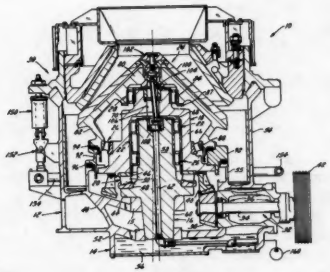
CONE CRUSHER

LeRoy Schuman, Milwaukee, Wis., assignor to Lippman-Milwaukee, Inc., Cudahy, Wis.

Continuation of Ser. No. 612,693, May 21, 1984, abandoned, which is a continuation of Ser. No. 338,273, Jan. 11, 1982, abandoned. This application Aug. 28, 1985, Ser. No. 771,135

Int. Cl.[4] B02L *2/04*

U.S. Cl. 241—215 **15 Claims**



1. A gyratory cone crusher comprising

a base;

a support member mounted on said base and projecting upwardly from said base; and

an eccentric member mounted on said support member and having a first portion extended over and surrounding said support member and a second portion projecting upwardly from said support member, a thrust bearing mounted on said support member in a position to operatively engage the lower end of said eccentric member said thrust bearing transmitting all of the thrust loads from the eccentric member to said support member;

a radial bearing means mounted between the support member and said first portion of the eccentric member to take radial loading applied to the eccentric member, said radial bearing means having its axis common with the axis of said thrust bearing, whereby the thrust bearing and the radial bearing means enable said eccentric member to rotate on the support member;

a bevel ring gear mounted on the lower end of said first portion of said eccentric member radially outwardly of said thrust bearing;

a crusher head assembly extending around and over said eccentric member and having a generally conical upwardly presented crushing surface;

second bearing means between said eccentric member and said crusher head assembly to enable said eccentric member to rotate relative to the crusher head assembly, the axis of said second bearing means being inclined slightly with respect to the common axis of the thrust bearing and radial bearing means, whereby the crusher head assembly will wobble as the eccentric member revolves within the crusher head assembly;

a crusher bowl assembly enclosing said crusher head assembly and having an inlet opening located generally over the crusher head assembly and a conical crushing surface spaced from the conical crushing surface on the crusher head assembly, the crushing surface of the bowl assembly being generally fixed in position with respect to said eccentric member, whereby material introduced into the housing through the inlet will be crushed in the space between the crusher head assembly and the bowl assembly.

4,589,601

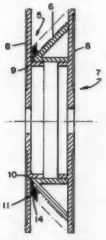
METHOD OF WINDING BRAZE STRIP MATERIAL

Albert R. Scherer, Cupertino, Calif., assignor to GTE Products Corporation, Stamford, Conn.

Filed May 28, 1985, Ser. No. 737,768

Int. Cl.[4] B65H *18/08, 75/18*

U.S. Cl. 242—1 **6 Claims**



1. The method of winding a long length of L shaped slotted brazing alloy strip on a spool, the strip comprising a leg portion and an ear portion orthogonal thereto, the method comprising the steps of providing a spool having a hub and a flange, the hub being acutely angularly disposed with respect to said flange, winding a first turn of said strip on said spool so that the ear portion of said first turn bears against said flange and the leg portion of said first turn rests on said hub, and winding a second turn of said strip onto said first turn so that the ear portion of said second turn bears against the ear portion of the first turn and the leg portion of said second turn rests on the leg portion of the first turn.

4,589,602

AUTOMATIC WINDING MACHINE

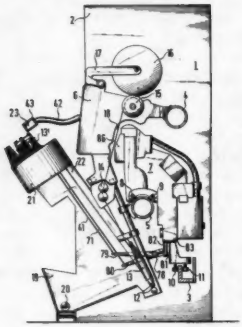
Franz-Josef Reiners, Ratheim; Herbert Knors, Mönchen-Gladbach; Leo Tholen, Heinsberg, and Heinz-Lorenz Topütt, Mönchen-Gladbach, all of Fed. Rep. of Germany, assignors to W. Schlafhorst & Co., Mönchen-Gladbach, Fed. Rep. of Germany

Filed Dec. 8, 1983, Ser. No. 559,867

Claims priority, application Fed. Rep. of Germany, Dec. 8, 1982, 3245326

Int. Cl.[4] B65H *54/20, 67/06*

U.S. Cl. 242—35.5 R **8 Claims**



1. Automatic winding machine, comprising a plurality of winding stations each having a bobbin unwinding location, a plurality of bobbin magazines each disposed at a respective winding station for receiving a plurality of bobbins on bobbin tubes in order with respect to their tips, the bobbins each having a thread end prepared for unwinding at a given location thereon, a thread suction device disposed above each respective bobbin magazine having a suction opening formed therein facing the upper end of a bobbin tube of a bobbin disposed in said bobbin magazine to be transferred to said unwinding location, said thread suction devices at each winding station including a suction tube extended from winding station to winding station, said suction tube being connectible to a suction source and having said suction openings formed in the bottom thereof, and a controllable slider at each winding station for individually closing a respective one of said suction openings.

4,589,603

APPARATUS FOR TEMPORARY STORAGE OF A STREAM OF PARTIALLY OVERLAPPING SHEETS

Hans Müller, Zofingen, Switzerland, assignor to Grapha-Holding AG, Hergiswil, Switzerland

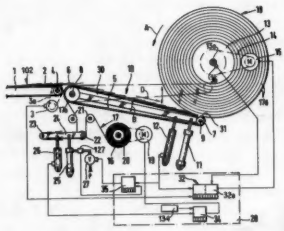
Continuation-in-part of Ser. No. 572,562, Jan. 18, 1984. This application Dec. 5, 1984, Ser. No. 678,242

Claims priority, application Switzerland, Jan. 21, 1983, 348/83; Dec. 8, 1983, 6569/83

Int. Cl.[4] B65H *29/70;* **B65B** *63/04*

U.S. Cl. 242—59 **12 Claims**

1. Apparatus for storing or paying out a stream of sheets, particularly a stream of partially overlapping folded paper sheets, comprising first and second rotors; a band having first and second end portions affixed to the respective rotors and an elongated median portion which is convoluted on said second rotor prior to storing of sheets and on said first rotor prior to paying out of stored sheets; adjustable drive means for rotating said first rotor at a variable speed in a direction to convolute the band thereon with attendant unwinding of the band from said second rotor; variable-speed conveyor means for supplying the sheets of said stream onto the median portion of said band at a predetermined location intermediate said rotors so that the sheets are confined between the convolutions of said band when said first rotor is rotated in said direction whereby the first rotor accumulates a growing roll of convoluted sheets alternating with convolutions of said band; first detector means arranged to monitor the speed of said conveyor means and to generate first signals denoting such speed; second detector means arranged to monitor the radius of the roll on said first rotor and to generate second signals denoting said radius; means for processing said first and second signals and for



generating third signals denoting the desired angular speed of said first rotor; third detector means for monitoring the angular speed of said first rotor and for generating fourth signals denoting the monitored angular speed of said first rotor; and means for adjusting said drive means when the characteristics of said third signals deviate from those of said fourth signals so that the actual angular speed of said first rotor matches said desired speed.

4,589,604

CAMERA DEVICE

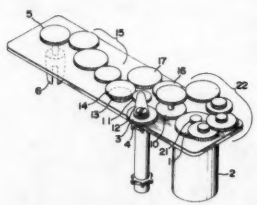
Michio Yagi, and Eiji Ito, both of Hachioji, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 327,270, Dec. 4, 1981, abandoned. This application Nov. 25, 1983, Ser. No. 554,379

Claims priority, application Japan, Dec. 9, 1980, 55-172652; Dec. 9, 1980, 55-172653; Dec. 24, 1980, 55-182097; Dec. 24, 1980, 55-182098; Dec. 24, 1980, 55-182099; Dec. 29, 1980, 55-185698; Dec. 29, 1980, 55-185699; Jan. 16, 1981, 56-3826; Mar. 24, 1981, 56-41722

Int. Cl.[4] G03B *1/04, 1/24*

U.S. Cl. 242—71.6 **10 Claims**



1. A camera device comprising

(i) a rotatable film winding spool, on the circumferential surface of which a film is wound,

(ii) a rotatable film rewinding spool, by the rotation of which the film is rewound,

(iii) a driving power source,

(iv) driving power transmission means for transmitting a driving power from said driving power source to said winding spool and rewinding spool, and

(v) one-way clutches each provided between said driving power transmission means and said winding spool and between said driving power transmission means and said rewinding spool,

(vi) wherein a revolution speed in a winding direction of said driving power transmission means during a winding oper-

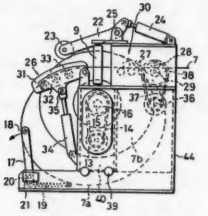
ation is set to a level not lower than a revolution speed of said rewinding spool rotated by the film.

4,589,605

LOOPING APPARATUS FOR COILED MATERIAL

Masaru Orii, Machida, Japan, assignor to Yugengaisha Kyodogiken, Tokyo, Japan

Filed Dec. 24, 1984, Ser. No. 685,317
Claims priority, application Japan, Dec. 29, 1983, 58-248474
Int. Cl.[4] B65H *16/04*
U.S. Cl. 242—55 8 Claims



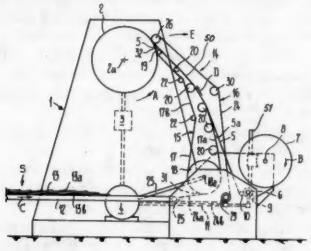
1. An apparatus for looping coiled material comprising:
an uncoiler mechanism for holding a coiled portion of the material and for unwinding the coiled material by rotating the coiled portion of the material about a horizontal axis; and
a loop guide mechanism disposed alongside said uncoiler mechanism for guiding the material unwound by the uncoiler mechanism helically from the coiled portion in a direction perpendicular to the direction of feed and forming a spiral loop of one turn, said loop guide mechanism including an adjustment means for adjusting the position of the loop top and said adjustment means having a fixed end and a free end, said fixed end pivotally fixed alongside said uncoiler mechanism, and said free end extending substantially vertically such that said loop guide mechanism engages said loop at an upper portion thereof, said uncoiler and loop guide mechanisms thereby providing a compact apparatus for looping coiled material.

4,589,606

APPARATUS FOR WINDING UP PRINTED PRODUCTS ARRIVING IN IMBRICATED FORMATION

Samuel Staub, Hinwil, Switzerland, assignor to Ferag AG, Hinwil, Switzerland

Filed Oct. 29, 1984, Ser. No. 665,664
Claims priority, application Switzerland, Nov. 7, 1983, 5984/83
Int. Cl.[4] B65H *20/06*
U.S. Cl. 242—76 13 Claims



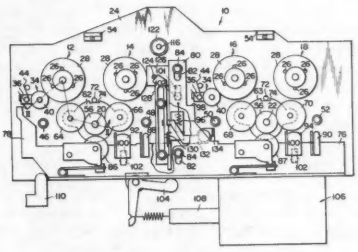
1. An apparatus for winding up products, especially flat products, such as printed products and the like, arriving in an imbricated formation having a lower side, comprising:
a rotatably journaled and drivable winding mandrel;
at least one pivotably journaled continuous conveyor having an arcuately movable outer end and capable of bearing against said winding mandrel or a product package formed thereon;
said at least one continuous conveyor serving for delivering said products to said winding mandrel;
a winding strap supply roll;
a winding strap having a side facing said winding mandrel and unwindable from said winding strap supply roll and positioned for being brought into contact with said lower side of said imbricated formation and connected to said winding mandrel and capable of being placed under tension and of being wound up on said winding mandrel conjointly with said products; and
said at least one continuous conveyor being situated with said arcuately movable outer end thereof located between said winding strap connected to said winding mandrel and said winding mandrel at said side of said winding strap facing said winding mandrel.

4,589,607

MAGNETIC RECORDING TAPE DRIVING APPARATUS

Minoru Kobayashi; Sinichi Saitou, and Goro Kitajima, all of Tokyo, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Jan. 18, 1985, Ser. No. 692,768
Claims priority, application Japan, Jan. 31, 1984, 59-15330
Int. Cl.[4] G11B *15/00*
U.S. Cl. 242—180 4 Claims

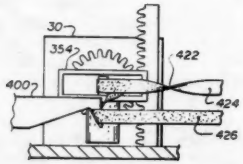


1. A magnetic recording tape driving apparatus comprising:
a rotational power generating means;
two pairs of reel shafts, on which a pair of reel hubs of each of a pair of cassette tapes are mounted;
two capstans each provided in a position corresponding to each pair of the reel shafts;
a head base plate supporting two magnetic heads and two pinch rollers each provided in a position corresponding to each pair of the reel shafts and movable between a first position, at which the magnetic heads and the pinch rollers are all spaced apart from the magnetic tapes accommodated in the respective paired cassette tapes with the reel hubs thereof mounted on the two pairs of reel shafts, and a second position, at which the magnetic heads and the pinch rollers are all in contact with the magnetic tapes accommodated in the paired cassette tapes; and
a power transmitting means for selectively transmitting rotational power from the rotational power generating means to the two capstans and the two pairs of reel shafts.

4,589,608
CASSETTE LOADING APPARATUS

George D. Rehklau, Los Altos; Lee A. Cotterill, San Jose, and Robert Z. Langevin, Los Gatos, all of Calif., assignors to Electro Sound, Inc., Sunnyvale, Calif.

Division of Ser. No. 436,051, Oct. 22, 1982, Pat. No. 4,512,527.
This application Mar. 29, 1985, Ser. No. 717,569
Int. Cl.[4] B65H *21/00*
U.S. Cl. 242—195 3 Claims



1. Apparatus for withdrawing, separating and twisting a length of leader material each end of which is connected to one of the spools of a tape cassette, comprising:

extractor means moveable between a leader engaging position and a loop extracting position and operative to withdraw a predetermined length of leader from a cassette positioned at a first position relative thereto;

leader engaging finger means disposed proximate said extractor means and operative to move from a retracted position to an engaging position wherein the distal end thereof engages and holds one portion of the leader extracted from said cassette;

means for transporting said cassette to a second position relative to said extractor means;

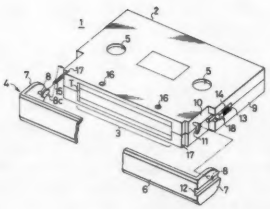
means for rotating said extractor means so that a portion of said leader extending from said extracting means to the other of said spools of said cassette is twisted 180°; and

leader holder means having a pair of leader holding slots, said holder means being carried by said transporting means and positioned immediately adjacent to said cassette such that as said cassette is transported from said first position to said second position, the leader portions held by said extracting means and said finger means are respectively caused to be received in said slots.

4,589,609
MAGNETIC TAPE CASSETTE

Kengo Oishi, and Osamu Suzuki, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jan. 7, 1985, Ser. No. 689,276
Claims priority, application Japan, Jan. 11, 1984, 59-1250[U]
Int. Cl.[4] G11B *23/087*
U.S. Cl. 242—198 3 Claims



1. A magnetic tape cassette comprising a cassette case incorporating a pair of hubs on which a magnetic tape is wound and having a magnetic head inserting opening formed in the front end wall thereof, and a guard panel substantially U-shaped in section having right and left end pieces, said guard panel being swingable vertically of said cassette case to close and open said opening of said cassette case, the improvement wherein:

said guard panel has a recess formed in at least one of said right and left end pieces opening towards said cassette case,

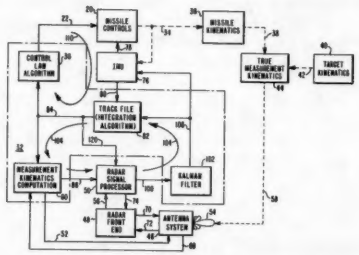
said cassette case has a pair of steps which are formed on right and left side walls thereof by setting back front end portions of said right and left side walls inwardly of said cassette case, and a slide groove formed in at least one of said right and left side walls in such a manner that said slide groove merges with said step formed on said one side wall and including upper and lower recesses formed respectively inside upper and lower halves of said one side wall in such a manner that said recesses extend towards the back of said cassette case, said cassette case being provided with a lock member having a locking protrusion protruding towards said guard panel and fitted in said recess formed in said end piece of said guard panel, said lock member being slidably inserted in said slide groove, and urging means for urging said lock member towards said guard panel, and

the two sides of said cassette are symmetrical in configuration.

4,589,610
GUIDED MISSILE SUBSYSTEM

Donald J. Schmidt, Ellicott City, Md., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Nov. 8, 1983, Ser. No. 549,861
Int. Cl.[4] F41G *7/22*
U.S. Cl. 244—3.19 16 Claims



1. A missile guidance subsystem disposed onboard a missile and operative during the flight of said missile to cooperate in guiding said missile to the location of a target, said missile guidance subsystem comprising:

a radar including an antenna system, a front end, and a signal processor, said antenna system governed by beam steering commands to maintain the beam pattern of said radar antenna on said target location, said front end for receiving radar echo signals within said beam pattern and conditioning said radar echo signals for processing by said signal processor, said signal processor for deriving true radar measurements of said missile kinematics in relation to said target kinematics from said conditioned radar echo signals;

control means governed by a set of maneuver commands to control said missile kinematics;

an inertial measuring unit for generating signals corresponding to the acceleration of said guided missile in accordance with predetermined spatial coordinates;

means for integrating said acceleration signals of said inertial measuring unit to generate estimates of the relative kinematics of said missile and target in accordance with said spatial coordinates;

means for converting said estimates of the relative kinemat-

ics into a priori estimates of radar measurements of said missile and target relative kinematics, and into beam steering commands for said radar antenna system, said signal processor operative to compute signals representative of the differences between corresponding estimated and true radar measurements;

filtering means for deriving error signals based on an estimating function of said computed radar measurement difference signals, said integrating means operative to generate intermediate relative kinematics estimates according to said spatial coordinates in the integration process thereof, said error signals derived in accordance with said spatial coordinates for correcting corresponding intermediate relative kinematics estimates of said integrating means to render said relative kinemaic estimates; and

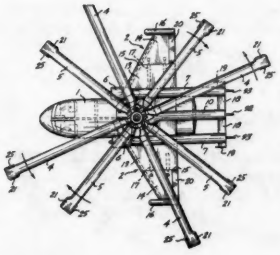
means for generating said set of maneuver commands based on a control law function of said relative kinematics estimates.

4,589,611

AIR JET REACTION CONTRAROTATING ROTOR GYRODYNE

Maurice Ramme, 6326 Beach Dr. SW., Seattle, Wash. 98136, and Monte Ramme, 17620 - 15th Pl. W., Alderwood Manor, Wash. 98036

Filed Mar. 1, 1983, Ser. No. 471,563
Int. Cl.⁴ B64C *27/18, 27/22*
U.S. Cl. 244—6 **7 Claims**



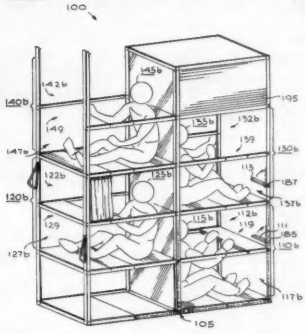
1. A gyrodyne comprising a hollow mast, contrarotating rotors carried by said hollow mast, turbofan engine means carried by the gyrodyne, air discharge means carried by the blades of said contrarotating rotors for discharging transversely thereof air received from said hollow mast to effect reaction rotation of said rotors, duct means connecting said turbofan engine means and said hollow mast for receiving bypass air from said hollow turbofan engine means and conveying it to said hollow mast for flow therethrough to the rotor blades, and control means for varying the distribution of the air flowing through said hollow mast from said hollow turbofan engine means to supply air to the blades of one of said rotors differing in amount from the amount of air supplied to the blades of the other of said rotors and being operable to vary the difference in such amounts including supplying to all the blades of one of said rotors substantially all the air flowing through said hollow mast from said turbofan engine means.

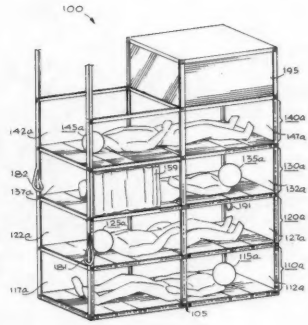
4,589,612

HIGH-DENSITY ACCOMMODATIONS SYSTEM UTILIZING CONVERTIBILITY FROM PARALLEL BEDDING TO VERTICALLY STAGGERED SEATING

Wibara Halim, Kebraon 59, Sepanjang, Surabaya 60222, Indonesia

Filed Aug. 13, 1984, Ser. No. 640,461
Int. Cl.⁴ B64D *11/06*; A47C *19/20*
U.S. Cl. 244—118.6 **7 Claims**





1. An accommodations module comprising:

(A) means defining at least one paired set of reconfigurable accommodations compartments, the members of each such set being mutually disposed as a superjacent compartment and a subjacent compartment;

(B) said means convertibly establishing, in relation to each of said compartments, a bedding configuration and a seating configuration, said respective configurations being adapted to receive and support an accommodations subject in respective generally-prone and generally upright-seated postures;

(C) each of said compartments having, for each associated configuration, a means-defined upper-torso section and a means-defined lower-torso section, where:

(1) the two sections of each compartment are generally horizontally-disposed in said bedding configuration and generally vertically disposed in said seating configuration; and,

(2) said means is constructed such that:

(a) the lower-torso section of said superjacent compartment in its bedding configuration becomes an upper-torso section for said subjacent compartment in its seating configuration; and,

(b) the respective upper-torso sections for said bedding

configurations become lower-torso sections for said seating configurations;

said means including an alterable support-member selectively positionable between:

(1) a lower-torso support disposition for said superjacent compartment in its bedding configuration; and,

(2) an upper-torso clearance disposition for said subjacent compartment in its seating configuration;

said means being constructed such that said compartments in their seating configurations define back-to-back seating positions for accommodations subjects;

said alterable support-member including a first segment which, in said member's subjacent clearance disposition, becomes both a lower-back support member for said superjacent compartment and an upper-back support member for said subjacent compartment.

4,589,613

COUNTERBALANCED HINGE ASSEMBLY

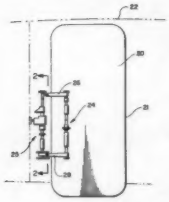
Allan W. Opsahl, Renton, Wash., assignor to The Boeing Company, Seattle, Wash.

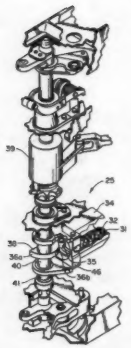
PCT No. PCT/US84/00179, § 371 Date Feb. 6, 1984, § 102(e) Date Feb. 6, 1984, PCT Pub. No. WO85/03486, PCT Pub. Date Aug. 15, 1985

PCT Filed Feb. 6, 1984, Ser. No. 598,555

Int. Cl.[4] B64C *1/14*

U.S. Cl. 244—129.5 **25 Claims**





1. In combination with a door of the type adapted to be shifted outwardly and inwardly to open and close an ingress/egress opening in a structural member during door opening and closing operations, respectively, about a generally vertical but inwardly canted hinge axis defined by a torque tube mounted in said structural member with freedom for rotation about said axis and drivingly coupled to said door by hinge link defining means, and wherein said door is required to move in an upslope direction through an angle β and thereafter in a downslope direction through an angle θ during door opening movement and upslope through an angle θ and thereafter downslope through an angle β during door closing movement as a direct result of pivotal door movement about said generally vertical inwardly canted hinge axis, the improvement in a counterbalanced hinge assembly comprising:

(a) radially extending cam means non-rotatably mounted on said torque tube, said cam means defining an arcuate profiled cam face having an included angle at least equal to the sum of the angles β and θ and wherein the radius of said cam means is smallest at the juncture of said angles β and θ; and,

(b) compressible/expandable energy storage means mounted on said structural member adjacent said cam means on said torque tube, said energy storage means including a first end bottomed on said structural member, a cam follower mounted on the opposite end thereof in engagement with said arcuate profiled cam face, and compressible/expandable means interposed between said first end and said cam follower for continuously biasing said cam follower into engagement with said arcuate profiled cam face;

so that when said door is at the highpoint in its path of movement between fully opened and fully closed positions, said cam follower engages said arcuate profiled cam face at the juncture of said angles β and θ so that: (i) as said door moves in a downslope direction through said angle β towards a fully closed position, said torque tube and said cam means rotate through said angle β and said cam follower traverses the portion of said arcuate profiled cam face coincident with said angle β for compressing said compressible/expandable means and storing energy therein; and (ii), as said door moves in a downslope direction through said angle θ towards a fully opened position, said torque tube and said cam means rotate through said angle θ and said cam follower traverses the portion of said arcuate profiled cam face coincident with said angle θ for compressing said compressible/expandable means and storing energy therein; whereby when said door is manually shifted from either a fully closed position moving upslope through said angle β or a fully opened position moving upslope through said angle θ, said compressible/expandable means expands and the energy stored therein imparts a counterbalancing rotational torque to said torque tube through said cam follower/cam face combination for counterbalancing the hinge moment attributable to the weight of said door and minimizing the amount of manually applied torque required to move said door along said upslope paths.

4,589,614

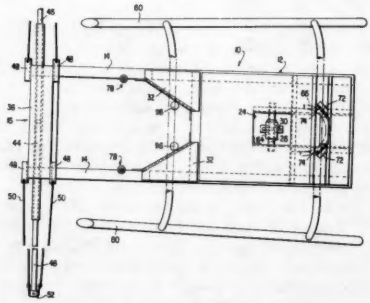
AERIAL BURNING AND FIRE CONTROL UNIT FOR A HELICOPTER

Grady E. Stevens, Natchitoches, La., assignor to International Paper Company, New York, N.Y.

Filed May 24, 1984, Ser. No. 613,486

Int. Cl.[4] B64D *1/18*

U.S. Cl. 244—136 **9 Claims**



1. An aerial burning and fire control unit for a helicopter of

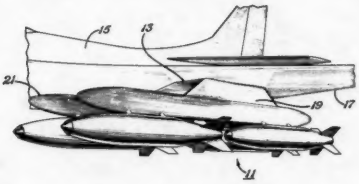
the type including a fuselage and a landing strut, said unit comprising a rear tank assembly, a pair of forward side rails projecting forwardly from said tank assembly, and a forward spray boom arrangement supported directly by said forward side rails, and positioning means and supporting means on said tank assembly and said forward side rail arrangement for fixedly and releasably supporting said unit beneath a helicopter fuselage and in an out of the way position within the general confines of a helicopter landing strut.

4,589,615

STORE LOAD AND EJECTOR DEVICE FOR AIRCRAFT

Ralph M. Walker, Jr., Fort Worth, Tex., assignor to General Dynamics Corporation, Fort Worth, Tex.

Filed Jul. 28, 1982, Ser. No. 402,464
Int. Cl.⁴ B64D 1/02
U.S. Cl. 244—137 R **23 Claims**



12. A unitary store load and ejector device for carrying stores on the exterior of an aircraft and for dispensing stores therefrom comprising:

a. a cap plate for connecting to a load bearing portion of an aircraft;

b. at least two strut members integrally connected to said cap plate and depending therefrom at opposite sides thereof;

c. at least two elongated support beams, each integrally connected respectively to one of said strut members and adapted to carry at least one store, each support beam adapted to carry at least one store ejector rack for attaching a store to its support beam and dispensing the store therefrom;

d. cross brace means integrally connected between said support beams for maintaining separation of said beams and any stores thereon and capable of reacting tension and compression forces thereon from said support beams and any stores thereon; and

e. said cross brace means being swept back at an angle for reducing the radar signature thereof.

4,589,616

CRUISE AIRSPEED CONTROL OF AIRCRAFT ALTITUDE CAPTURE

Terry L. Zweifel, Phoenix, Ariz., assignor to Sperry Corporation, New York, N.Y.

Filed Jan. 24, 1984, Ser. No. 573,446
Int. Cl.⁴ G05D 1/08
U.S. Cl. 244—180 **13 Claims**

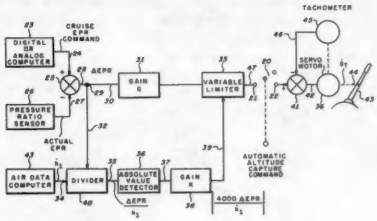
1. Engine control apparatus for an automatic flight control system including a throttle position controller for urging an aircraft to capture a commanded airspeed during an altitude capture maneuver comprising:

means responsive to an operational characteristic of said engine for generating a signal representing actual engine thrust,

means for generating a signal representing a predetermined engine thrust at said commanded airspeed and a predetermined altitude,

means for generating a signal representing an actual rate of change in altitude,

means for combining said actual engine thrust signal, said predetermined engine thrust signal and said altitude rate signal for generating a command signal to drive said throt-



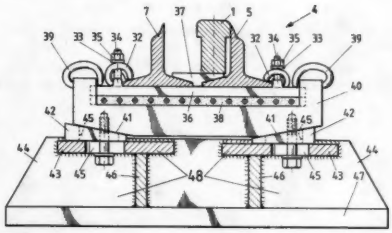
tle position controller for urging said aircraft to capture said airspeed.

4,589,617

FROG FOR SWITCHES

Bernd-Joachim Kempa, Berlin, Fed. Rep. of Germany, assignor to Elektro-Thermit GmbH, Berlin, Fed. Rep. of Germany

Continuation of Ser. No. 140,870, Apr. 16, 1980, abandoned.
This application Jan. 9, 1985, Ser. No. 689,519
Claims priority, application Fed. Rep. of Germany, Jun. 6, 1979, 2922862
Int. Cl.⁴ E01B 7/14
U.S. Cl. 246—388 **9 Claims**



1. A switch for high-speed running railway track comprising:

a frog having a junction rail mounted in a rotatable manner, said junction rail being arranged to close a gap between the pairs of rails of straight track and branch track, a rail of straight or branch track being designated as a transit rail; said junction rail having its ends formed in the shape of an isosceles triangle and wherein the corresponding ends of the transit rail are tapered on one side only, each tapered end of a transit rail being equal in dimension to one side of the isosceles triangle of the junction rail; the ends of the junction rail being subject to elastic deformation to provide a continuous rail-head profile during engagement between the junction rail and the tapered end of the transit rail.

4,589,618

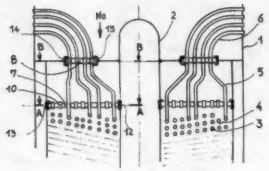
HOLDING DEVICE FOR A TUBE BUNDLE

Yves Fournier, Chatenoy le Royal, France, assignor to Creusot-Loire, Paris, France

Filed Oct. 21, 1982, Ser. No. 435,599
Claims priority, application France, Oct. 23, 1981, 81 19980
Int. Cl.⁴ F16L 3/22
U.S. Cl. 248—68.1 **4 Claims**

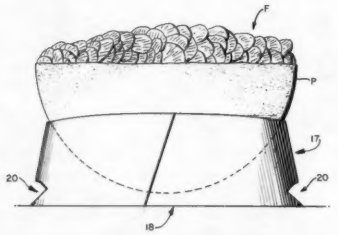
1. In a vessel within which a fluid flows around tubes in a bundle, arranged in rows, the combination of said tubes with a holding device comprising

(a) on opposite sides of each of said rows, at least one pair of metal strips each having undulations forming spaces for receiving said tubes, the undulations of the two strips arranged on opposite sides of a said row facing each other;
(b) clamping means arranged between said undulations for clamping opposite strips toward each other with said tubes gripped therebetween;
(c) the ends of said strips being joined to fixed portions of said vessel;



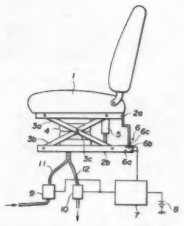
(d) each of said strips having, at the level of each of said undulations in contact with a said tube, in the transverse direction, a curvature greater than the curvature of said tube; and
(e) each of said strips having a slight continuous curvature in a transverse direction, so that each said strip and the corresponding tube are in contact in a quasi-punctual zone.

4,589,619
FOOD HOLDER
Hampton E. Forbes, Jr., Wilmington, Del., assignor to Westvaco Corporation, New York, N.Y.
Continuation-in-part of Ser. No. 511,101, Jul. 6, 1983, abandoned. This application Feb. 14, 1984, Ser. No. 580,130
Int. Cl.[4] A47J *43/00*
U.S. Cl. 248—174 **6 Claims**



1. A single blank for making a food holder capable of supporting a food product and prepared from foldable material comprising, an elongated central panel having two opposed ends, a top edge and a bottom edge, and a pair of integral end panels each having two opposed ends, top edges and bottom edges, the end panels extending outwardly and upwardly with respect to the central panel and each end panel having one free end and one end joined to the central panel along upwardly converging score fold lines, the combined length of the end panels being slightly greater than the length of said central panel between its two opposed ends with one free end of one of said end panels being shaped to provide a glue area for adherence to the free end of the other end panel, said score lines being inclined upwardly and inwardly with respect to one another and at the same angular relationship with respect to the vertical, said central panel and end panels each being of about the same height with straight top edges and curved bottom edges, said bottom edges being formed by a single arc of constant radius, and said top edges being arranged so that the top edges of said end panels are each inclined upwardly and outwardly from the top edge of said central panel at the same angular relationship with respect to one another and with respect to the horizontal, as the angular relation of said inclined score lines from the vertical, said blank forming a sleeve with an elliptical cross section when the end panels are overlapped and adhered together with converging ends formed by the inclined score lines and with a bottom opening and a smaller top opening dimensioned such that a food product is supportable on said top edges.

4,589,620
SEAT WITH AN AIR SUSPENSION
Takao Sakamoto, Akishima, Japan, assignor to Tachikawa Spring Co., Ltd., Tokyo, Japan
Filed Dec. 20, 1983, Ser. No. 563,441
Int. Cl.[4] A47C *3/30*
U.S. Cl. 248—550 **7 Claims**



1. A vehicle seat comprising:
an upper seat frame adapted to support a seat occupant;
a lower seat frame adapted to be fixed to a floor of the vehicle;
coupling means for interconnecting said upper and lower seat frames to permit said upper seat frame to be movable relative to said lower seat frame between raised and lowered positions;
an air suspension system including air inlet means for introducing pressurized air to responsively raise said upper seat frame in a direction towards said raised position and air discharge means for discharging air to responsively lower said upper seat frame in a direction towards said lower position;
height adjustment means operatively connected to said air inlet and air discharge means for automatically adjusting the height of said vehicle seat to a predetermined normal position intermediate of said raised and lowered positions, said height adjustment means having detector means for detecting whether said seat is in said raised or lowered positions and to effect correction of said seat height by moving said upper seat frame into said normal position, said detector means including
(a) upper and lower detectors each including light-emitting means for emitting light and light-receiving means, spaced from and in opposing registry with said light-emitting means, for receiving said emitted light and for generating an output signal in response thereto; and
(b) light shield means fixed to said upper seat frame so to be movable within the space defined between each said opposing light-emitting and light-receiving means to shield said light-receiving means from said emitted light of said opposing light-emitting means to prevent said light-receiving means from generating said output signal;
said height adjustment means further including circuit means operatively coupled to said air inlet and outlet means and to said detector means for receiving said outputs from each said light-receiving means, said circuit means including first logic gate means for issuing a first command to said air discharge means only in response to receiving an

output signal from both said light-receiving means of said upper and lower light detectors to thereby discharge air from said air suspension means and thus lower said vehicle seat, and second logic gate means for issuing a second command signal to said air inlet means only in response to an absence of output signals from said light-receiving means of said upper and lower light detectors to thereby introduce air into said air suspension means to thereby raise said vehicle seat;

wherein said first gate means includes NAND gate means for outputting a logic zero in response to receiving an output signal from said light-receiving means of both said upper and lower light detectors, and inverting means for inverting said logic zero outputted from said NAND gate means to a logic one whereby said air discharge means is operated.

4,589,621

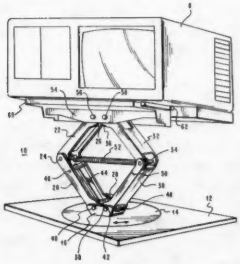
ERGONOMIC MONITOR STAND

Ronald E. Hunt, Georgetown, and Verlon E. Whitehead, Austin, both of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jan. 3, 1984, Ser. No. 567,702

Int. Cl.⁴ F16M *13/00*

U.S. Cl. 248—586 **6 Claims**



1. A variably positionable support stand for computer work station having a base comprising:

a platform adapted for limited pivotal motion, attached to the base of the workstation;

a six bar linkage connected at one side to the platform, said linkage including selectively adjustable upward force exerting spring means for compensating for the downward force exerted by the workstation,

said spring means comprising coil springs each having one end thereof attached to a lower member of the six bar linkage and the other end thereof engaged in a manually alterable tension adjuster; and

a rotatable base connected to a side of the linkage opposite the side connected to the platform.

4,589,622

ADJUSTABLE SUPPORT LEGS

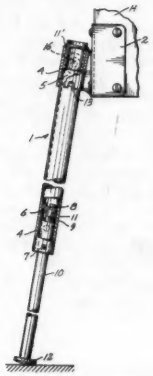
Donald J. Hutter, P.O. Box 7372, Everett, Wash. 98201

Filed Nov. 29, 1984, Ser. No. 676,164

Int. Cl.⁴ F16M *13/00*

U.S. Cl. 248—649 **5 Claims**

1. An adjustable leg for use in supporting an article free-standing comprising a bracket adapted to be secured to the article in fixed position and having a collar with a central bore, a first elongated hollow leg section slidable lengthwise through said bore of said collar to adjust the effective length of said first leg section, a second elongated leg section slidable in said first leg section, means for locking said second leg section in fixed position relative to said first leg section but releasable to permit sliding movement of said two leg sections, and releasable clamping means, separate from said locking means, carried by said collar for bearing against the outer periphery of said first leg section so as to lock said first leg section in fixed position relative to said collar, said first leg section having a radial opening positionable, with said clamping means released, in alignment with said clamping means and said clamping means being optionally actuatable so as to extend through said radial opening and bear against the outer periphery of said second leg section to lock said second leg section in fixed position relative to said collar.



4,589,623

MOLD FOR PRODUCING T-SHAPED RUBBER HOSES

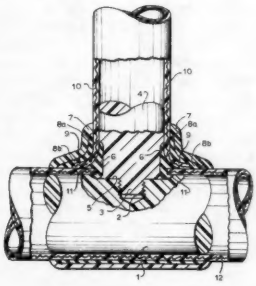
Frank Horch, Buxtehude; Hermann Brockmann, Buchholz, and Hans-Georg Fuchs, Buxtehude, all of Fed. Rep. of Germany, assignors to Phoenix Aktiengesellschaft, Hamburg, Fed. Rep. of Germany

Filed Nov. 5, 1984, Ser. No. 668,415

Claims priority, application Fed. Rep. of Germany, Feb. 3, 1984, 3403727

Int. Cl.⁴ B29C *33/50, 33/56*

U.S. Cl. 249—83 **5 Claims**



1. A mold for producing a T-shaped rubber hose composed of a main hose having a sidewall with an opening therein defining an edge and a secondary hose joined at one end to the main hose adjacent to the opening thereof so that together they form a T, comprising:

a main mandrel having a disk-shaped recess formed therein on which the main hose is mountable with the opening thereof disposed adjacent to, and in substantial registry with, said main mandrel recess;

a secondary mandrel on which the secondary hose is mountable, said secondary mandrel having a cylindrical recess adjacent to one end thereof adapted to receive a vulcanizable rubber sleeve thereon and being disengageably secured at said one end to said main mandrel adjacent to said main mandrel recess so that said mandrels are arranged in the form of a T and so that said respective recesses thereof communicate and cooperate with one another to define an interior mold cavity, whereby when the hoses are mounted on said respective mandrels they will be disposed in the form of a T and when the rubber sleeve is vulcanized under pressure it will fill said interior mold cavity; and

an outer mold part mountable on the main hose and the secondary hose after they are mounted on said main mandrel and said secondary mandrel respectively, said outer mold part being configured and dimensioned to surround the hoses in the zone of connection thereof and to define between the hoses and itself an exterior mold cavity adapted to receive a vulcanizable rubber mixture therein which when vulcanized under pressure fills said exterior mold cavity, whereby the end of said secondary hose and the edge of the opening in the sidewall of said main hose are embedded in rubber.

4,589,624

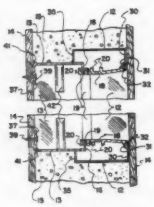
WINDOW BUCK OR POURING FRAME

Kenneth H. Jones, 1425 N. 1000 West, Mapleton, Utah 84663

Filed May 21, 1984, Ser. No. 612,726

Int. Cl.[4] B28B *7/30*

U.S. Cl. 249—177 **16 Claims**



1. A reusable window buck or pouring frame for forming a window opening in a cast concrete wall or the like, said window buck or pouring frame comprising

an outer rectangular frame structure formed from four, elongate, substantially flat, board-like base members which are attached together in end-to-end arrangement so as to define a rectangular enclosure which is generally open at its opposite, broad, first and second ends;

an inner rectangular frame structure formed from four, elongate, substantially flat, board-like side walls which are attached together in end-to end arrangement so as to define a substantially rectangular enclosure which is generally open at its opposite, broad, first and second ends, with the first open end of the inner rectangular frame having a dimension which allows said inner rectangular frame to be inserted through the corresponding first open end of the outer rectangular frame structure such that at least a portion of the inner rectangular frame structure is received in mating relationship within the outer rectangular frame structure;

releasable clamp means are provided for releasably securing the inner and outer rectangular frame structures together as a substantially interlocked unit, said clamp means comprising

at least one elongate, rigid clamp member provided for at least one of the four base members of the outer rectangular frame structure, with each clamp member being pivotally connected at one of its ends to a mutually corresponding base member at a location on the base member which is adjacent to or at the second open end of the outer rectangular frame structure, whereby each clamp member extends at least to the inner rectangular frame structure when the inner rectangular frame structure is mated with the outer rectangular frame structure; and

means for releasably securing the extending ends of the clamp members to the inner rectangular frame structure.

4,589,625

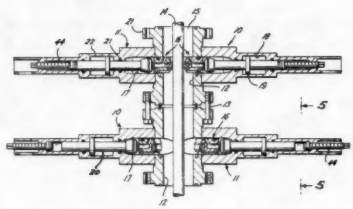
HYDRAULICALLY OPERATED VALVES

Marvin R. Jones, Houston, Tex., assignor to Koomey Blowout Preventers, Inc., Houston, Tex.

Division of Ser. No. 337,383, Jan. 6, 1982. This application Dec. 27, 1983, Ser. No. 565,771

Int. Cl.[4] E21B *33/06*

U.S. Cl. 251—1.3 **12 Claims**



1. A blowout preventer ram for use in a blowout preventer having a housing with a bore therethrough and chambers which intersect the bore and in which the ram is received for reciprocation within one chamber between an inner position in which it engages another ram recriprocable in the other chamber to close the bore and an outer position in which it is withdrawn into the one chamber to open the bore, said ram comprising a body having packing extending across the front to engage the front packing of the other ram, along the sides of the ram body outwardly and over the top of the ram body to connect the outer ends of the side packing, so that when the rams are moved inwardly to closed positions, the packing forms a continuous seal between the ram and the other ram and the one chamber in which it reciprocates, a groove in the lower side of the ram body to fluidly connect the bore of the housing beneath the closed rams with the chamber on the outer end of the ram body, and a passageway in the ram body connecting the outer end thereof within the area circumscribed by the continuous seal to connect the chamber with the bore above the closed rams, said passageway being of larger minimum cross-sectional area than the groove, whereby relatively high fluid flow resistance through the groove and relatively low fluid flow resistance through the passageway ensure fluid pressures in the chamber on the outer end of the ram much lower than fluid pressures below the rams when fluid flow occurs.

4,589,626

HOSE CLAMP

Leonard D. Kurtz, Woodmere, and Joseph LiCausi, Port Jefferson Station, both of N.Y., assignors to BioResearch Inc., Farmingdale, N.Y.

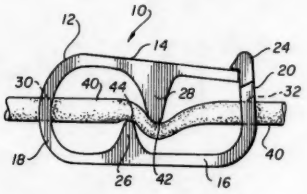
Filed Mar. 13, 1985, Ser. No. 711,184

Int. Cl.[4] F16L *55/14*

U.S. Cl. 251—10 **5 Claims**

1. A clamp for controlling flow through hoses or flexible tubing, said hoses or flexible tubing being positioned between two clamping elements which control flow through the hose or tubing, said clamp comprising a generally U-shaped body, having generally parallel upper and lower leg members connected by a curved end portion, one of said clamping elements

extending upwardly from said lower leg member, the other extending downwardly from said upper leg member, one of said clamping elements located at a point on said clamp which is slightly forward of the other clamping element when the clamp is brought into closed position, said clamping elements disposed so that they overlap each other when viewed along the tubing axis when the clamp is closed in order to create friction against pulling the tube through the clamp, a flexible arm member extending upwardly from and forming approxi-



mately a right angle with the rearward end of the lower leg member and projecting beyond the upper leg member, a protruding ledge member located in said flexible arm member at a position approximately level with said upper leg member, capable of retaining the upper leg member when the clamp is brought to a closed position, said curved end portion having an opening capable of receiving a hose or flexible tubing, and said flexible arm member having an opening capable of receiving a hose or flexible tubing, said opening aligned with the opening in said curved end portion.

4,589,627

PRESSURE MEDIUM ACTUATED VALVE

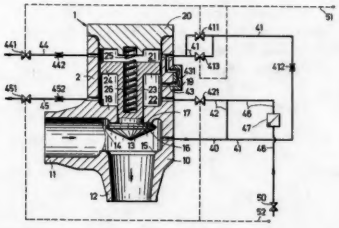
Karlheinz Grotloh, Winterthur, Switzerland, assignor to Sulzer Brothers Limited, Winterthur, Switzerland

Filed Jan. 28, 1985, Ser. No. 695,266

Claims priority, application Switzerland, Jan. 26, 1984, 358/84

Int. Cl.[4] F16K *31/124*

U.S. Cl. 251—25 **7 Claims**



1. A pressure medium actuated valve comprising

a casing having a valve chamber, an inlet for conveying a pressure medium to said chamber, an outlet for conveying pressure medium from said chamber and a cylinder sealingly spaced from said chamber;

a piston movably mounted in said cylinder to divide said cylinder into a first piston chamber which enlarges upon movement of said piston from an operative position to a safety position within said cylinder and a second piston chamber which decreases upon said piston movement;

a rod extending from said piston into said valve chamber;

a lid mounted on said rod within said valve chamber for closing said outlet from said valve chamber;

at least one spring in said cylinder biasing said piston towards said safety position;

a first relief line extending from said first piston chamber to a pressure medium sink;

a first control valve in said first relief line for controlling a flow of pressure medium therethrough;

a second relief line extending from said second piston chamber to a pressure medium sink;

a second control valve in said second relief line for controlling a flow of pressure medium therethrough;

a first connecting line between said valve chamber and said first piston chamber;

a third control valve in said first connecting line for controlling a flow of pressure medium therethrough;

a second connecting line between said valve chamber and said second piston chamber;

a fourth control valve in said second connecting line for controlling a flow of pressure medium therethrough; and

a third connecting line having one end connected to a chamber part extending from the cylinder-side end of said third control valve through said first connecting line, said first piston chamber and said first relief line to the cylinder-side end of said first control valve and a second end connected to said casing at a position which communicates with said second piston chamber with said piston in said operative position and which communicates with said first piston chamber with said piston in said safety position.

4,589,628

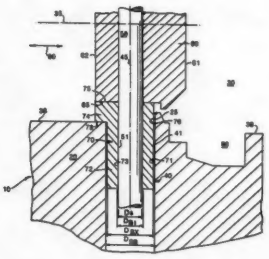
UNITARY BEARING AND LOCATOR ASSEMBLY FOR ROTATABLE VALVES

James E. Barker, Sauk Rapids, and James C. Hadley, Sartell, both of Minn., assignors to General Signal Corporation, Stamford, Conn.

Continuation-in-part of Ser. No. 416,505, Sep. 10, 1982, abandoned. This application Jun. 14, 1984, Ser. No. 620,436

Int. Cl.[4] F16K *31/44*

U.S. Cl. 251—214 **6 Claims**



1. In a valve means, suitable for use with high temperature and pressure fluids, including a valve body having a fluid passageway therethrough, at least one shaft bore extending into said valve body, a valving member disposed within said fluid passageway and rotatably mounted on a shaft supported within said shaft bore, sleeve bearing means between said shaft and said shaft bore, thrust bearing means for supporting said shaft and said valving member and locating means for positioning and aligning said valving member within said fluid passageway, the improvement being a unitary sleeve and thrust bearing and locating means comprising:

a hollow body portion inserted within said shaft bore and having said inserted therethrough so as to provide a sleeve bearing means for said shaft upon rotation of said shaft;

a shoulder flange portion integrally formed with said hollow body portion and disposed between said valve member and said valve body to provide, in combination with said hollow body portion, a thrust bearing means for said shaft and said valving member, and also having sufficient dimensional thickness and configuration with respect to said

hollow body portion to provide a reliable locating means for positioning and aligning said valving member;

at least a portion of the perimeter of said shoulder flange being linear and engaging a corresponding linear surface of said valve body so as to prevent rotation of said unitary sleeve and thrust bearing and locator means with respect to said valve body; and

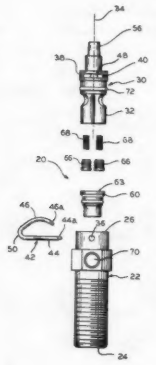
said shoulder flange portion including a lower surface having a radiused configuration and said valve body including a corresponding surface adjacent said shaft bore such that said shoulder flange lower surface matingly engages said valve body surface to further restrict rotation of said unitary sleeve and thrust bearing and locating means and such that said shoulder flange lower surface reduced the effect of destructive stresses applied to said shoulder flange portion as the thrust bearing means.

4,589,629

NON-RISE FAUCET ASSEMBLY

Thomas E. Gaffney, Kenosha, and Scott C. Baker, Palmyra, both of Wis., assignors to Universal-Rundle Corporation, New Castle, Pa.

Filed Dec. 10, 1984, Ser. No. 679,991
Int. Cl.[4] F16K *31/44, 51/00*
U.S. Cl. 251—288 **17 Claims**



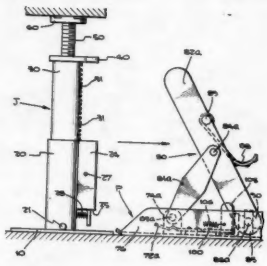
1. A non-rise faucet assembly comprising a shank having a lower end through which fluid is introduced and also having an upper end including a chamber in fluid communication with said lower end, a removable stem adapted for insertion into said chamber and having a lower end forming a movable valve in said chamber to permit regulated flow of fluid through said faucet assembly, said stem having an axis of rotation and said valve being movable in response to non-rising rotation of said stem in said chamber about said axis, one of said shank and said stem having a bore arranged generally transversely of said axis of rotation of said stem, the other of said shank and said stem having a pair of diametrically opposed slots in alignment with said bore after said stem has been inserted into said chamber in said shank, said slots and said bore defining a continuous passageway through said shank and said stem, unitary stop-lock means for retaining and limiting rotation of said stem in said chamber including a first portion adapted to extend completely through said bore and said slots, and means for preventing unintended removal of said unitary stop-lock means.

4,589,630

DUAL AUTOMOBILE JACK FOR CONSUMER USE

Harry H. Arzouman, Los Angeles, Calif., assignor to Safe-T-Jack, Inc., Irvine, Calif.

Filed Mar. 13, 1985, Ser. No. 711,380
Int. Cl.[4] B60P *1/10*
U.S. Cl. 254—7 B **1 Claim**



1. In a two-part jacking system including an extendible jack stand having a flat base plate, a hollow frame secured to said base plate, and a vertical shaft adapted for telescoping movement within said frame, and a power unit adapted to be aligned with and releasably attached to the jack stand for selectively raising or lowering it, improved alignment and attachment means comprising:

a pair of pins extending horizontally outward from opposite sides of said hollow frame and spaced above said base plate;

the power unit having a flat bottom plate which is bifurcated and adapted to slide over said base plate of the jack stand and around the hollow frame but underneath said pins; and

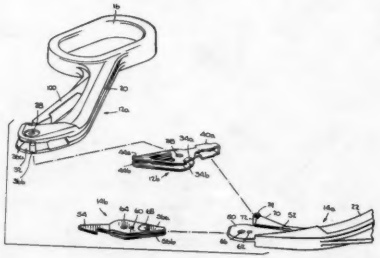
a pair of elongated spring members supported upon said bottom plate in generally parallel relation thereto and adapted to pass over said pins for releasably attaching the power unit to the jack stand.

4,589,631

SURGICAL STAPLE REMOVER

Richard L. Markus, Bridgeport, Conn., assignor to United States Surgical Corporation, Norwalk, Conn.

Filed Sep. 28, 1984, Ser. No. 655,636
Int. Cl.[4] B25C *11/00*
U.S. Cl. 254—28 **9 Claims**



1. A surgical staple remover comprising:

a first longitudinal handle piece having a proximal handle portion and a distal aperture transverse to a first longitudinal axis which extends from the handle portion to the aperture of the first handle piece;

a second longitudinal handle piece having a proximal handle portion and a distal aperture transverse to a second longi-

tudinal axis which extends from the handle portion to the aperture of the second handle piece, the first and second longitudinal axes intersecting at the apertures of the first and second handle pieces and thereby defining a first plane to which the apertures of the first and second handle pieces are perpendicular;

a first longitudinal nose piece having (a) a distal nose portion including two laterally spaced, distally extending fingers parallel to the first plane, (b) an intermediate aperture perpendicular to the first plane, and (c) proximal surfaces transverse to the first plane and nonconcentric with the aperture of the first nose piece, the proximal surfaces of the first nose piece mating with distal surfaces of the first handle piece when the aperture in the first handle piece and the aperture in the first nose piece are coaxial so that the first handle piece and the first nose piece pivot as a unit about the coaxial apertures;

a second longitudinal nose piece having (a) a distal nose portion including a single distally extending finger laterally intermediate the two laterally spaced fingers and parallel to the first plane, (b) an intermediate aperture perpendicular to the first plane, and (c) proximal surfaces transverse to the first plane and nonconcentric with the aperture of the second nose piece, the proximal surfaces of the second nose piece mating with distal surfaces of the second handle piece when the aperture in the second handle piece and the aperture in the second nose piece are coaxial so that the second handle piece and the second nose piece pivot as a unit about the coaxial apertures; and

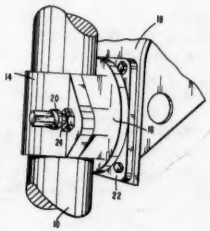
a pivot pin through the coaxial apertures in all of the first and second pieces, the pivot pin being the sole means for holding together any two of the first and second handle pieces and the first and second nose pieces.

4,589,632

JACK LOCKING MECHANISM

Larry D. Smith, 9902 Wentworth Dr., Westminster, Calif. 92683

Filed Dec. 9, 1983, Ser. No. 560,076
Int. Cl.⁴ B60P *9/02*
U.S. Cl. 254—418 **22 Claims**



15. A swivelable jack apparatus for attaching to a vehicle, comprising:

an extensible jack for engaging a supporting surface;

clamp means for pivotally securing the jack in a selected position on the vehicle;

a locking apparatus for locking the jack in a selected position of swivel comprising:

a housing threadably coupled to the clamp means, the housing having threads on its inside surface;

a member, fixedly coupled to the vehicle, having at least one socket formed therein; and

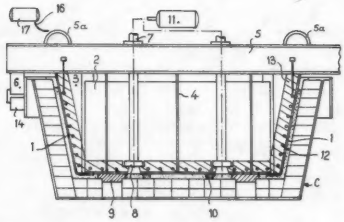
a locking pin having a head, an extensible section for engaging the socket, and a threaded portion disposed between the head and the extensible section for threadably engaging the threads on the inside surface of the housing for extending the extensible section into engagement with the at least one socket or retracting the extensible section into the housing disengaging from the at least one socket, as selected, by the application of a turning force to the locking pin head.

4,589,633

PROCESS AND INSTALLATION FOR MOULDING A REFRACTORY LINING OF A CONTAINER FOR LIQUID METAL

Jacques Gilson, Rue Vieille 15A, 5593 Baronville; Jean M. Thomas, 12 Rue du Village, 5051 Bolinne, both of Belgium; Guy Prioretti, 8 Rue Saint Louis, 54400 Longwy Bas, and Pierre Henry, 23 Rue de l'Etang, 54410 Laneuveville Dt Nancy, both of France

Filed Jan. 26, 1984, Ser. No. 573,961
Int. Cl.⁴ F27D *1/16*
U.S. Cl. 266—44 **19 Claims**



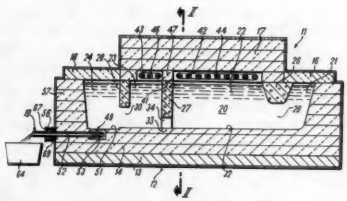
1. A process for moulding a refractory lining in a liquid metal container having inner walls, comprising placing a forming mould inside the container, the mould comprising wall means defining an outer mould surface, introducing a refractory product in the form of an unshaped aggregate between the inner walls of the container and the outer mould surface of the forming mould, said mould surface being such as to impart to the aggregate a substantially uniform thickness throughout parts of the container which must receive the lining, and drying the lining aggregate by heating said outer surface of the mould by means of heating elements disposed within the thickness of said wall means of the mould while heat insulating a side of the heating elements remote from said outer surface.

4,589,634

FURNACE FOR SMELTING NON-FERROUS AND/OR FOR HOLDING NON-FERROUS METAL MELTS

Gerhard Bleickert, Raiserstrasse 3, D6920 Sinsheim-Weiler, Fed. Rep. of Germany

Filed Mar. 17, 1983, Ser. No. 476,073
Int. Cl.⁴ F27D *11/02*
U.S. Cl. 266—215 **7 Claims**



1. A furnace for smelting non-ferrous metals and for holding non-ferrous metal melts, comprising:

a multiple-chamber trough having a bottom and side walls within which at least one-filling chamber, at least one smelting chamber, at least one holding chamber and at least one drain chamber are defined, each chamber having a given length anu given width;

plurality of plate means within said trough serving with said side walls and bottom of said trough to define said at least one filling chamber, said at least one smelting chamber, said at least one holding chamber and said at one drain chamber, such that the filling chamber communicates with the smelting chamber via a first passage, the smelting chamber communicates with the holding chamber via a second passage, the holding chamber communicates with the drain chamber via a third passage, the first, second and third passages are located beneath the surface of the metal melt when in the trough, and the second passage extends over only a portion of the width of the holding chamber and the melting chamber;

at least one first lid covering the smelting chamber and the holding chamber, said at least one first lid including an inner surface of which first heating means are provided for transmitting heat directly to the smelting chamber and second heating means are provided for transmitting heat to the holding chamber;

at least one second lid covering the filling chamber; and

at least one third lid covering the drain chamber, wherein said at least one first lid rests on said plurality of plate means to separate, along with said plurality of plate means, said chambers from each other to prevent any communication between said chambers other than through said passages.

4,589,635

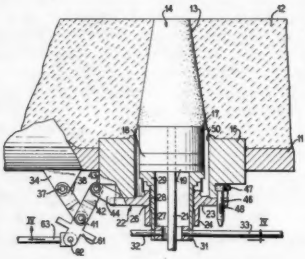
POROUS PLUG RETAINER

James E. Reichard, Youngstown, and Robert L. Hamilton, Boardman, both of Ohio, assignors to Pollock Company, Youngstown, Ohio

Filed May 24, 1984, Ser. No. 613,260

Int. Cl.⁴ C21C *5/48*; B22D *41/08*; B67D *5/00*; C21B *7/16*

U.S. Cl. 266—220 **2 Claims**



1. A porous plug retainer for a container comprising, a circular opening formed in a bottom wall of said container, a first cylindrical member attached to said bottom wall about said circular opening, a refractory block mounted in said container and having a conical shaped opening aligned with said opening in said bottom wall of said container and said first cylindrical member, a porous conical shaped plug receivably mounted in said conical shaped opening in said refractory block, a second member detachably connected to said first cylindrical member and having a cylindrically shaped porous plug engaging portion which is engageable with said porous plug, said second member having a threaded sleeve threadedly received in said second member and engageable with said porous plug engaging portion for adjusting the vertical position of said porous plug, a first handle attached to said threaded sleeve to rotate it, a set screw threadedly received through said second member and engageable with said threaded sleeve to lock it in a fixed position, a pipe attached to said porous plug engaging portion and extending downwardly through said second member and below said threaded sleeve, a first pair of links pivotally attached to the lower surface of said container, a second pair of links with first ends pivotally attached to said first pair of links with their other ends pivotally attached to said second member, and an actuating handle pivotally attached to said first and second pair of links and said second member movable downwardly and over the lower end of said pipe to allow said second member to move to a position so that said conical plug can be replaced.

4,589,636

GRASPING DEVICE FOR A ROD INSERTABLE INTO AND WITHDRAWABLE FROM THE TAPHOLE OF METALLURGICAL FURNACES, PARTICULARLY TAPPING RODS

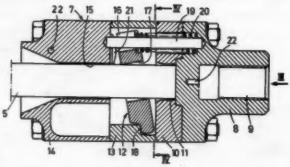
Albrecht Bäumer, An der Stetze 25, D-5910 Kreuztal-Eichen; Werner Schneider, Biedenkopfer Strasse 16, D-5900 Siegen 1; Hans-Jörg Müller-Späth, In der Kredenbach 5, D-5910 Kreuztal 9, and Eberhard Brücher, Lohweg 35, D-5900 Siegen 21, all of Fed. Rep. of Germany

Filed Oct. 29, 1984, Ser. No. 666,220

Claims priority, application Fed. Rep. of Germany, Oct. 28, 1983, 3339127

Int. Cl.⁴ C21C *5/48*

U.S. Cl. 266—271 **5 Claims**



1. In a taphole drilling machine having a counterblow hammer having a grasping device adapted to receive and releasably retain a tapping rod for the taphole of a metallurgical furnace; the improvement in which the grasping device comprises a housing, and within this housing a tilting member, a stop within the housing against which one end of the tilting member rockably bears, the tilting member having therein a recess of a size larger than a said tapping rod to receive therein a said tapping rod, means engageable with the tilting member on the side of the tilting member opposite said stop to urge said tilting member to a tilted position in which the tapping rod is grasped by the margins of said recess, and means for selectively acting against the tilting member in a direction opposite to the direction in which said urging means urges the tilting member to tilt, thereby to swing the tilting member back about the stop to a position in which a said tapping rod can be freely inserted into or withdrawn from said recess.

4,589,637

APPARATUS FOR MELTING SCRAP METAL AND INGESTION OF SOLIDS IN MOLTEN METAL

Pervez J. F. Bamji, Kingston, Canada; John F. Evans, Oswego, N.Y., and Nigel P. Fitzpatrick, Kingston, Canada, assignors to Alcan International Limited, Montreal, Canada

Filed Mar. 26, 1984, Ser. No. 593,717

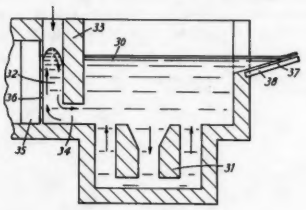
Claims priority, application United Kingdom, Mar. 28, 1983, 8308449

Int. Cl.⁴ H05B *6/20*

U.S. Cl. 266—234 **7 Claims**

1. An apparatus for melting scrap metal comprising a main metal melting chamber, means for supplying heat energy to molten metal in said main melting chamber, a solid metal particle submergence chamber in communication with said main melting chamber for passage of molten metal from said main melting chamber to said submergence chamber, a moving magnetic field device located adjacent one boundary wall of said submergence chamber, a baffle located opposite said one wall and having a passage for molten metal beneath its bottom

margin, said moving magnetic field device being adapted to establish a strong upflow and standing wave in said molten



metal adjacent said one wall and a strong downflow adjacent said baffle.

4,589,638

DECOUPLING DIAPHRAGM FOR TWO-CHAMBER ENGINE MOUNTS

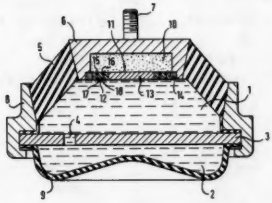
Manfred Hofmann, Hünfelden, and Karl-Heinz Klöckner, Niederwerth, both of Fed. Rep. of Germany, assignors to Metzeler Kautschuk GmbH, Munich, Fed. Rep. of Germany

Filed Jun. 28, 1984, Ser. No. 625,460

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1983, 3323178

Int. Cl.⁴ F16F *1/36, 15/04*

U.S. Cl. 267—8 R **7 Claims**



1. Decoupling device for engine mounts having upper and lower liquid chambers containing hydraulic fluid for damping vibrations, comprising a diaphragm liquid-tightly fastened to an upper region of the upper liquid chamber defining a diaphragm chamber divided-off from the upper liquid chamber, said diaphragm including a circular rubber body having a horizontal central plane and a vibration-cancelling mass in the form of a central, circular, metallic disc adhering to said circular rubber body, said circular rubber body having upper and lower surfaces, each of said surfaces having two concentric, circular slots formed therein being inclined toward each other as seen in direction from the horizontal central plane of said circular rubber body toward said surfaces thereof, and said slots being extended to the vicinity of the horizontal central plane of said circular rubber body.

4,589,639

CENTERING DEVICE

Gary S. Peifer, Waynesville, and Charles R. Russell, Edwards, both of Ill., assignors to Caterpillar Tractor Co., Peoria, Ill.

Division of Ser. No. 571,287, Jan. 16, 1984, abandoned. This application Feb. 25, 1985, Ser. No. 705,155

Int. Cl.⁴ B60K *23/00*; F16F *1/12*

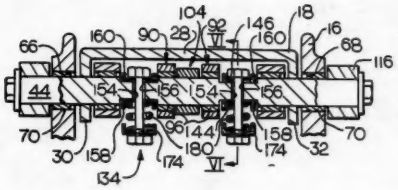
U.S. Cl. 267—150 **12 Claims**

1. A centering mechanism comprising:

an elongated member;

a shaft member having opposing flat portions formed thereon and a bore extending therethrough, said elongated member being positioned within the bore of the shaft member to loosely support the shaft member thereon for limited rotation about an axis that is normal to the axis of the elongated member;

a first and second plate each being loosely disposed on the



elongated member in embracing relation to the flat portions on the shaft member; and

means for biasing said plates towards embracing engagement with the flat portions and permitting movement of the plates away from each other during rotation of the shaft member.

4,589,640

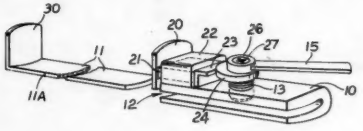
CONNECTOR

James Pert, 56 Home Street TFI, Edinburgh, Scotland (EH3 9NA)

Continuation of Ser. No. 408,167, Aug. 16, 1982, abandoned. This application Sep. 26, 1985, Ser. No. 780,245

Int. Cl.⁴ B25B *3/00*

U.S. Cl. 269—2 **13 Claims**



1. A connector comprising a keeper having an open-sided slot formed longitudinally therein for the insertion of a bar, said slot including an upper surface, a lower surface and a single side connecting said upper and lower surfaces, a bar which can be inserted into and removed from said slot, through the open side thereof, said bar having a top face which is adjacent said upper surface of said slot when said bar is engaged in said slot, a single threaded aperture formed in one of said upper and lower surfaces of said keeper transversely to said slot, and a single threaded locking pin located in said aperture in said keeper to engage said bar in a locking position of the pin, said slot and said bar having a similar transverse deformation in the form of a radiussed curve.

4,589,641

DEVICE FOR CLOSING UP THE GROOVES IN THE TABLE OF A MACHINE SAW

Raymond Erhard, Willer-sur-Thur, France, assignor to SMID S.A., Lutterbash, France

Filed Apr. 24, 1985, Ser. No. 726,425

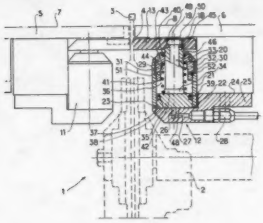
Claims priority, application France, Apr. 24, 1984, 84 06544

Int. Cl.⁴ B23Q *3/00*

U.S. Cl. 269—289 R **9 Claims**

1. Device for closing up the grooves in the tops of the front and rear tables of a machine for sawing materials in sheets, these grooves being perpendicular to the sawing-line, charac-

terized by the fact that it comprises for each groove (9) an obturator (13) activated by means of propulsion (20, 21, 34) and



subjected to a vertical course to fit into the groove (9) of the table (5, 6).

4,589,642

OPERATING TABLE

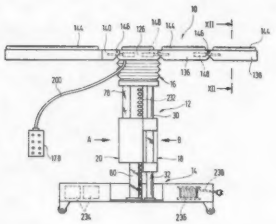
Eberhard Schnelle; Hans-Ulrich Jung; Rüdiger Mussler, and Reinhard Pfeuffer, all of Rastatt, Fed. Rep. of Germany, assignors to Stierlen-Maquet AG, Rastatt, Fed. Rep. of Germany

Filed Jul. 17, 1984, Ser. No. 631,593

Claims priority, application Fed. Rep. of Germany, Aug. 10, 1983, 3328908

Int. Cl.[4] A61G *13/00*

U.S. Cl. 269—325 **16 Claims**



1. An operating table including a support surface with several support surface sections adjustable relative to one another by means of hydraulic cylinders, a support column for the support surface with a column head on which the support surface is pivotally supported and adjustable by means of hydraulic cylinders for movement about its longitudinal axis and/or its transverse axis, said support column also having a column foot, an hydraulic lifting apparatus connected between said column foot and said column head for raising and lowering said column head relative to said column foot, and a single hydraulic unit for operating both said cylinders and said lifting apparatus, said hydraulic unit including a hydraulic pump, a pump motor, and a pressure fluid tank, and said hydraulic unit being fixed to said column head for raising and lowering movement therewith relative to said column foot.

4,589,643

CONTAINER

Jens Breum, Korsor, Denmark, assignor to Kahler & Breum, Denmark

Filed May 3, 1984, Ser. No. 606,694

Claims priority, application Denmark, May 10, 1983, 2079/83

Int. Cl.[4] B65D *45/32*

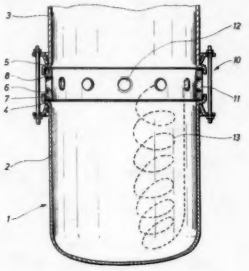
U.S. Cl. 220—5 R **1 Claim**

1. A container comprising:

two separate cup-shaped end portions with opposing openings;

a separate substantially cylindrical annular intermediate portion compressed between said end portions and having a plurality of peripheral bores therethrough for mounting of external apparatus;

said end portions including facing, outwardly stepped corbelled rims surrounding their openings, and surrounding and centering said intermediate portion; and



tightening means to compress the end portions about the intermediate portion so that each of said corbelled rims sealingly engages said intermediate portion;

said tightening means applying force directly to said corbelled rims to urge the corbelled rims inwardly toward the intermediate portion.

4,589,644

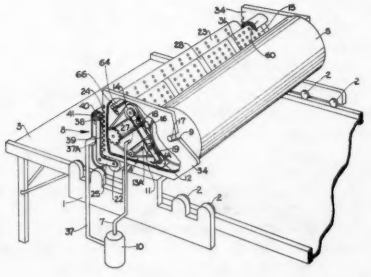
COMBINATION CLOTH SPREADING MACHINE AND COMPLEMENTARY MOVING KNIFE

Jack M. Gratsch, 6220 Britton Ave., Cincinnati, Ohio 45227

Continuation-in-part of Ser. No. 642,378, Aug. 20, 1984, Pat. No. 4,529,186. This application Jul. 15, 1985, Ser. No. 755,185

Int. Cl.[4] B65H *29/46*

U.S. Cl. 270—31 **16 Claims**



1. A combination cloth supply feed mechanism and a cutter knife for removing tension from cloth obtained from a supply of cloth and severing said cloth for forming multi-layers of cloth comprising:

a feed roller to control the rate at which the cloth is removed from said supply of cloth;

first and second tension adjustment rollers;

a perforated endless belt; said perforated belt passing about said feed roller and said first tension adjustment roller with a non-slipping engagement forming cloth carrying and return flights therebetween;

said second tension adjustment roller being shiftably mounted between a normal position adjacent said return flight and an actuated position engaging and stretching said return flight;

means to shift said second tension adjustment roller between said normal and said actuated positions;

means to drive said feed roller;

a friction clutch in association with said first tension adjustment roller so that said first tension adjustment roller is rotated by said belt only; and cutter means to sever the cloth;

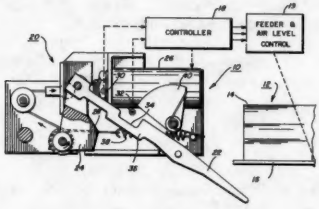
whereby when said second adjustment roller is positioned from said normal position to said actuated position, said return flight of said belt is stretched, and when said second adjustment roller is rapidly returned to its normal position, said first adjustment roller is momentarily stopped, causing the stretch of said return flight to be taken up by said feed roller whereby slack is created in said cloth carrying flight converting said cloth carrying flight to said condensing section, said cloth being severed by said cutting means at the end of said condensing portion.

4,589,645

DOCUMENT SET SEPARATOR AND STACK HEIGHT SENSOR

Michael J. Tracy, Hilton, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 3, 1985, Ser. No. 783,383
Int. Cl.[4] B65H *7/14*
U.S. Cl. 271—3.1 **7 Claims**



1. In a recirculating document handler for a copier for recirculating document sheets from a stack thereof in a document tray of the document handler to be copied and to be restacked therein after copying, with a document feeder for feeding the documents from the stack which is automatically controlled in response to sensing means for sensing the approximate height of the stack and for sensing each time the stack has been so recirculated, in response to the position of elevation relative to said stack of a set separator finger, the improvement comprising:

two spaced switch means positioned to be variably actuated in response to varible positions of said set separator finger, by switch actuating means integral said set separator finger, for actuating one, none, or both of said switch means at respective different positions thereof,

and control means for providing at least five different said automatic controls in reponse to four different combinations of sensed actuations or non-actuations of said two spaced switch means and the operating times at which said combinations of actuations or non-actuations are sensed.

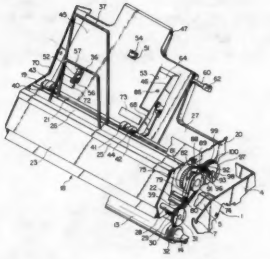
4,589,646

AUTOMATIC PAPER FEEDING DEVICE FOR A PRINTER

Hideaki Ozawa; Seiji Hoshino, and Yoshimitu Nagashima, all of Iruma, Japan, assignors to Silver Seiko Ltd., Japan

Filed Nov. 19, 1984, Ser. No. 672,663
Claims priority, application Japan, Nov. 25, 1983, 58-220566
Int. Cl.[4] B65H *5/06*
U.S. Cl. 271—4 **8 Claims**

1. A device for automatically feeding a print medium from a supply station to a receiving station via a rotatable feeding element of a printer or typewriter, comprising: a driving element operable to rotate in synchronism with said feeding element; a first feed member for feeding a print medium from said supply station to said feeding element; a second feed member driven by said driving element to feed a print medium fed from said feeding element to said receiving station; and means for intermittently transmitting rotation of said driving element to said first feed member to allow a print medium to be fed from said supply station to said feeding element by said first feed member after another print medium has been discharged from said feeding element and fed to said receiving station by said second feed member, said means including a clutch sleeve connected to be driven by said driving element, a clutch spring partially wrapped around said clutch sleeve and having one end connected to said first feed member, and a controlling cam



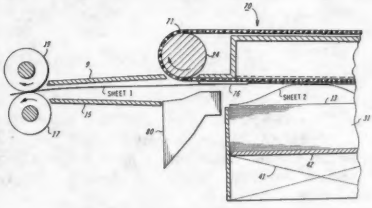
connected to be driven by said driving element for controlling said clutch spring between a first position in which said first feed member is connected to be driven by said clutch sleeve and a second position in which said first feed member is disconnected from said clutch sleeve, said cam having a circumferential cam face positioned for engagement with an outer extension of the other end of said clutch spring to hold said clutch spring to said second position over a part of a complete rotation of said controlling cam, said spring clutch being held to said first position when said outer extension thereof is free from said circumferential cam face of said controlling cam over the other part of a complete rotation of said controlling cam.

4,589,647

TOP VACUUM CORRUGATION FEEDER WITH A VALVELESS FEEDHEAD

George J. Roller, Penfield, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Nov. 29, 1984, Ser. No. 676,441
Int. Cl.[4] B65H *3/12*
U.S. Cl. 271—94 **8 Claims**



1. A high speed top sheet separator-feeder for separating and forwarding sheets including flimsy sheets seriatim from the top of a stack of sheets, comprising a stack tray for supporting a stack of sheets to be fed, endless vacuum belt means extending through at least the front end of the sheet stack tray for acquiring and advancing the top sheet of the stack, said vacuum belt means extending across a support surface having vacuum ports therein for positioning a negative pressure at the back of the belt means, and wherein the motion of said vacuum belt means

is adapted to cease prior to the trail edge of the acquired sheet exposing all of said vacuum ports, air knife means positioned in front of the stack tray for applying air pressure to the sheets in the stack tray to separate the top sheet from the next adjacent sheet, and vacuum means for applying a continuous and uniform negative pressure to said vacuum ports during the feeding of sheets from the stack tray in order to increase the through put of said separator-feeder by acquiring the next sheet to be fed simultaneously with said cease of motion of said vacuum belt means such that said next sheet assumes a concaved appearance.

4,589,648

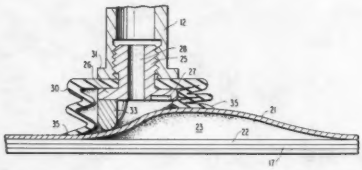
PINCH-ACTION SUCTION CUP

Louie R. Hancock, Summerville, S.C., assignor to Westvaco Corporation, New York, N.Y.

Filed Oct. 22, 1984, Ser. No. 663,715

Int. Cl.[4] B65H *3/08*

U.S. Cl. 271—106 **1 Claim**



1. A suction head for a paper sheet feeder mechanism comprising rigid piping means secured to articulated arm means, axial aperture means through said piping means in fluid communication with vacuum pumping means for drawing atmospheric air therethrough, rigid sealing face means terminating said piping means around said aperture means, a first portion of said sealing face means being integral with said piping means and a second portion being threadably secured to said piping means, flexible bellows means having an internal perimeter in fluid communication with said aperture means and extending axially from said sealing face means, said bellows means having an integral annular portion at one axial end thereof disposed in a plane normal to said bellows extension axis and pneumatically sealed around and between said first and second sealing face portions, another end of said bellows having flexible, annular lips surrounding an open mouth portion of said bellows other end for sealably engaging the flat plane of a sheet of paper and protrusion means integral with said sealing face second portion positioned within said bellows internal perimeter, said protrusion means having structural form to provide a substantially single abutment point laterally of said bellows extension axis within said internal perimeter for engaging the flat plane of said sheet of paper between said bellows lips and said sealing face means.

4,589,649

OSCILLATING SHEET SEPARATING SUCTION HEAD ON PARALLELOGRAM LINKAGE

Dieter Prescher, Leipzig, German Democratic Rep., assignor to VEB Kombinat Polygraph "Werner Lamberz" Leipzig, Leipzig, German Democratic Rep.

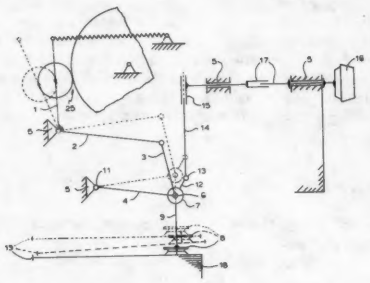
Filed Jul. 20, 1984, Ser. No. 633,094

Claims priority, application German Democratic Rep., Sep. 16, 1983, 2548605

Int. Cl.[4] B65H *3/08*

U.S. Cl. 271—107 **5 Claims**

1. A sheet-separating device, comprising at least one sheet-separating suction head engageable with an uppermost sheet of a sheet stack and vertically movable to separate the uppermost sheet from the stack; a suction tube, said suction head being rigidly connected to said suction tube; a driven parallelogram linkage unit (2, 3, 4, 5) including four-links pivotally connected to each other of which a fourth link is connected to said suction tube, said parallelogram linkage unit imparting to said suction head a substantially vertical movement over a curved path so as to enable said suction head to come into contact with the uppermost sheet and vertically lift the latter; and oscillating means (4, 12, 14, 15) including a crank (4) pivotally connected



to said suction head and being said fourth-link of said unit, a connecting rod rigidly connected to said suction tube, a slidable bar pivotally connected to said connecting rod, and a guide in which said bar is vertically slidable, whereby said oscillating means operate to impart to said suction head during said vertical lifting an additional oscillating movement in a horizontal direction.

4,589,650

PAPER FEEDING DEVICE

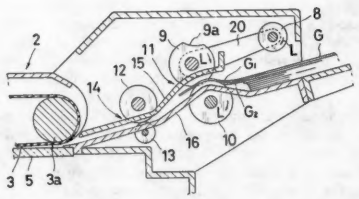
Yoshitake Miyoshi, Ikoma, Japan, assignor to Mita Industrial Co., Ltd., Osaka, Japan

Filed Aug. 28, 1984, Ser. No. 645,096

Claims priority, application Japan, Sep. 28, 1983, 58-181618

Int. Cl.[4] B65H *9/00, 3/06*

U.S. Cl. 271—242 **5 Claims**



1. A paper feeding device for feeding sheets in a feed direction, said device comprising:

upper and lower parallel shafts having respective axes;

conveyor rollers for conveying sheets in the feed direction, said conveyor rollers comprising top rollers mounted on said upper shaft and bottom rollers mounted on said lower shaft, said top and bottom roller rotating in the same direction and being arranged on the respective said shafts to alternate with each other in a direction along the lengths of said shafts, said axes of said shafts being spaced by a distance which is less than the sum of the radii of an adjacent pair of said top and bottom rollers;

timing rollers mounted downstream of said conveyor rollers, with respect to the feed direction; and

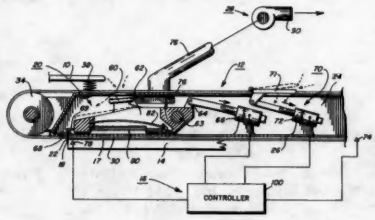
each said top roller having a recess formed in the circumference thereof at a position such that, when a leading end of a sheet conveyed by said conveying rollers abuts said timing rollers, said recesses in said top rollers face in directions toward circumferences of said bottom rollers.

4,589,651

VACUUM DOCUMENT FEEDER

Morton Silverberg, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 17, 1985, Ser. No. 788,299
Int. Cl.[4] B65H *9/06*
U.S. Cl. 271—245 **4 Claims**



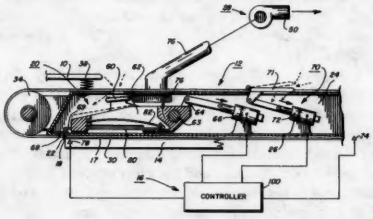
1. In a document feeder with a vacuum belt platen transport system for transporting document sheets over the platen of a copier under a vacuum plenum backing surface closely overlying said platen and into a registration position for imaging the document sheet, with registration means for stopping the document sheet at a said registration position, said platen transport system including a vacuum source for applying a partial vacuum to a document sheet being transported sufficient to provide transport of the document sheet with movement of said belt transport into said registration means, and means for automatically reducing the level of said partial vacuum in said vacuum plenum sufficiently to allow slippage of a document sheet relative to said belt transport at said registration means, and wherein said registration means comprises document engaging registration fingers movable into and out of the path of a document sheet being transported by said vacuum belt platen transport system, the improvement wherein said means for automatically reducing the level of said partial vacuum in said vacuum plenum comprises valve means directly actuated by said registration means by mechanical connection to said movable registration fingers to automatically reduce the vacuum level in said vacuum plenum in direct response to said movement of said registration fingers into the path of a document sheet.

4,589,652

PLURAL LEVEL VACUUM DOCUMENT FEEDER

Morton Silverberg, Rochester, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Oct. 17, 1985, Ser. No. 788,373
Int. Cl.[4] B65H *9/06*
U.S. Cl. 271—245 **2 Claims**



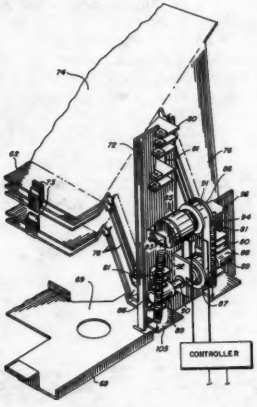
1. In a document feeder with a vacuum belt platen transport system for transporting document sheets over the platen of a copier under a white vacuum plenum backing surface closely overlying said platen and into a registration position for imaging the document sheet, with registration means for stopping the document sheet at a said registration position, said platen transport system including a vacuum source for applying a partial vacuum to a document sheet being transported sufficient to provide transport of the document sheet with movement of said belt transport into said registration means, and means for automatically reducing the level of said partial vacuum in said vacuum plenum sufficiently to allow slippage of a document sheet relative to said belt transport at said registration means and to avoid damage to said document sheet by said registration means; the improvement comprising means for prior detection of a document sheet of greater than a predetermined size to be registered by said registration means, and wherein said vacuum belt platen transport system comprises plural unapertured spaced apart moving belts between which said partial vacuum is applied, and wherein said partial vacuum level is automatically reduced to less than approximately 8 millimeters of water in response to said means for prior detection of a document sheet of greater than a predetermined size, and wherein said belts continue to move after the document sheet is stopped at said registration position by said registration means with slippage between said belts and the document sheet.

4,589,653

CANTILEVERED SORTER

Denis J. Stemmle, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.

Filed Apr. 1, 1985, Ser. No. 718,614
Int. Cl.[4] B65H *31/24, 39/11*
U.S. Cl. 271—293 **22 Claims**



1. A sorter comprising a plurality of vertically nestable moveable bins,

a frame member for supporting said bins adjacent only one edge of said bins, said bins being supported in said frame in cantilevered fashion only about one edge and being open and unsupported at any other edge;

each bin comprising a sheet stacking bed together with plural means to movably support and frictionally slide the bin in said frame,

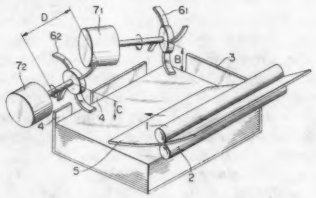
said plural means comprising at least two support means slidingly engagable with said frame and sufficiently vertically spaced apart to prevent static equilibrium of vertical forces acting on the support means when the coefficient of friction between the support means and the frame is at least 0.3 such that the friction force between the support means and the frame is less than the weight of the bin together with any copy sheets thereon and means to sequentially vertically move said bins in said frame past a sheet entrance position.

4,589,654

SHEET ALIGNING DEVICE

Masanobu Kanoto, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 27, 1983, Ser. No. 565,365
Claims priority, application Japan, Jan. 7, 1983, 58-969
Int. Cl.[4] B65H *29/22, 31/34*
U.S. Cl. 271—314 **6 Claims**



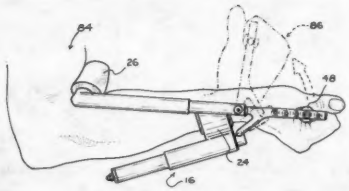
1. A sheet aligning device comprising:
a sheet receiving member for superposedly stacking sheets advancing thereto;
sheet positioning means for positioning two sides of the stacked sheets orthogonal to each other;
main displacing means opposed to an advancing corner of the advancing sheet, said main displacing means frictionally contacting the advancing sheet at said corner to displace said advancing sheet in an oblique direction to the advancement so as to bring said sheet into contact with said sheet positioning means; and
an auxiliary displacing means opposed to an advancing side of said advancing sheet, said auxiliary displacing means displacing said advancing sheet forwards with a weaker displacing force than that of said main displacing means so as to help said positioning.

4,589,655

WRIST AND FOREARM EXERCISE APPARATUS

David Ammon, 1115 Park Willow Ct., Milpitas, Calif. 95035

Filed Oct. 5, 1984, Ser. No. 657,981
Int. Cl.[4] A63B *5/00*
U.S. Cl. 272—67 **17 Claims**



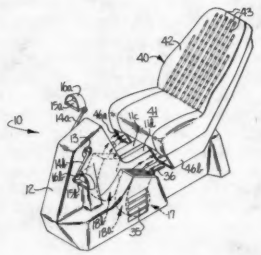
1. A wrist and forearm exercise apparatus comprising:
an elongated frame provided with a first arcuate member proximate a first end thereof, and a second arcuate member proximate a second end thereof, said first arcuate member and said second arcuate member extending in opposite directions from said frame receive a person's forearm, wherein said first arcuate member and said second arcuate member are spaced apart such that said first arcuate member engages said forearm proximate the wrist and said second arcuate member engages said forearm proximate its juncture with the upper arm;
a grip assembly having a first end pivotally attached to said first end of said frame, said grip assembly being provided with a grip unit proximate a second end thereof;
a tensioning assembly including an adjustment member coupled to said frame, and biasing means coupled to said adjustment member, whereby said adjustment member may vary the biasing force exerted by said biasing means, wherein said tensioning assembly further includes a base member coupling said adjustment member to said frame, and wherein said biasing means includes an expansion spring attached at one end to said adjustment member and at its other end to said coupling means; and
coupling means for coupling said biasing means to said grip assembly.

4,589,656

AEROBIC EXERCISE DEVICE FOR INCREASED USER COMFORT

Dan D. Baldwin, Independence, Va., assignor to Nautilus Sports/Medical Industries, Inc., Lake Helen, Fla.

Filed Nov. 7, 1984, Ser. No. 668,984
Int. Cl.[4] A63B *69/16*
U.S. Cl. 272—73 **12 Claims**



1. A device for aerobic exercise characterized by increased user comfort, especially during extended periods of exercise, said exercise device comprising:
an elongate frame;
a housing enclosing said frame;
stress imposing means carried by one end portion of said frame and comprising:
a shaft journaled for rotation on said frame and extending outwardly through opposite sides of said housing,
crank arms carried by opposite ends of said shaft,
pedals mounted on the outer ends of said crank arms;
fan means rotatably mounted on said frame within said housing; and
means disposed within said housing drivingly connecting said shaft to said fan means such that the driving of said fan means applies a load on said shaft and pedals;
air inlet means carried by said housing and communicating with the input side of said fan means for supplying air to said fan means;
user supporting and positioning means carried by the other end portion of said frame opposite said stress imposing means and comprising a seat portion inclined from front to rear at a predetermined acute angle to the horizontal and a backrest portion inclined at a predetermined acute angle to the vertical, at least said backrest portion having ventilation openings therein communicating with the front and rear surfaces of said backrest portion; and
air passage means communicating with the discharge side of said fan means and with said ventilation openings in said backrest portion for directing air discharged by said fan means through said ventilation openings to the forward surface of said backrest portion and outwardly therefrom whereby such air cools the user and substantially increases user comfort, particularly during long periods of use.

4,589,657

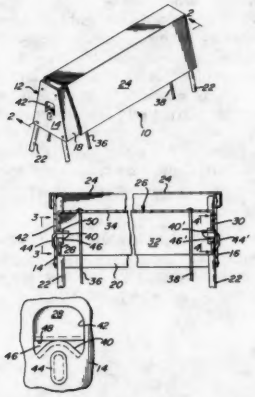
INFANT SWING CARRIAGE SUPPORT

David Saint, Elverson, Pa., assignor to Graco Metal Products, Inc., Elverson, Pa.

Continuation-in-part of Ser. No. 466,176, Feb. 14, 1983, abandoned. This application Feb. 27, 1984, Ser. No. 583,279

Int. Cl.[4] A63G 9/00

U.S. Cl. 272—85 19 Claims



1. In a swing comprising a frame having end walls at opposite ends thereof, a carriage having end walls at opposite ends thereof, said carriage being supported by the frame end walls for oscillation about a horizontal axis by discrete sets of mating structures, each set of mating structures including a short projection integral in one piece and struck from a frame end wall, each projection extending horizontally from said frame end wall into a projection receiving means in the adjacent carriage end wall so that the carriage is supported by a horizontal surface of said projection, each projection being in line contact along said horizontal surface with said projection receiving means, and means for suspending a swing seat from said carriage.

4,589,658

POWER SQUAT, WEIGHT LIFTING APPARATUS

Russell K. Gibson, 7504 Winesap Way, Louisville, Ky. 40228

Filed Jul. 26, 1983, Ser. No. 517,195

Int. Cl.[4] A63B 21/00

U.S. Cl. 272—134 10 Claims

1. A power squat, weight lifting apparatus for strengthening the leg muscles while eliminating back injuries to the user, said apparatus comprising:

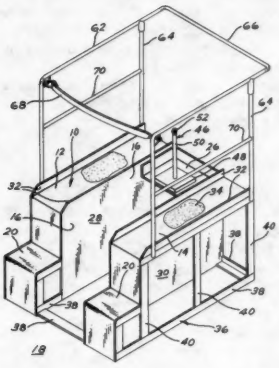
a. an elevated rack having a pair of elongated platforms that are separated by a well section;

b. step means at one end of the pair of platforms serving as an entrance for mounting and dismounting the rack;

c. a weight holder having a base with a vertical post for supporting a variety of weights;

d. and a waist harness including a heavy belt with interior padding that extends above the top edge and below the bottom edge of the belt, and strap means suspended from the belt between the legs of the user, said strap means including a V-shaped front strap suspended from the front of the belt, and a V-shaped rear strap suspended from the rear of the same belt, and a connector member joining the lower ends of both front and rear straps, and adjustable connecting means for joining the said connector member to the upper end of the said post of the weight holder, said post being unobstructed and freely supported by said waist harness when in use;

e. whereby the weights are adapted to be connected to said connector member and are fully supported from the padded waist harness during the complete power squats performed by the user over the well and the user may exercise with the weights carried by the weight holder operating within the well section while the user moves between a full standing position and a full squatting position so that the weight is carried solely by the user's lower body.



4,589,659

FOLDABLE LIQUID CRYSTAL DISPLAY UNIT

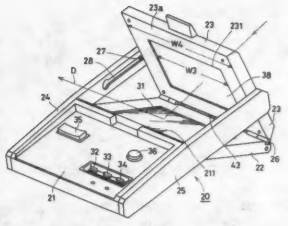
Gunpei Yokoi, and Ichiro Shirai, both of Kyoto, Japan, assignors to Nintendo Co., Ltd., Kyoto, Japan

Filed Jul. 20, 1984, Ser. No. 632,709

Claims priority, application Japan, Aug. 1, 1983, 58-141289; Aug. 1, 1983, 58-120429[U]

Int. Cl.[4] A63F 9/00

U.S. Cl. 273—1 GC 18 Claims



1. A foldable liquid crystal display unit capable of being in a folded condition and an opened condition, said liquid crystal display unit comprising:

a main housing (21) having a rear edge laterally extending between both sides of the rear portion thereof;

a mirror housing (22) having a front edge and a rear edge, each extending in the lateral direction, said front edge being rotatably connected with said rear edge of said main housing (21);

a mirror (31) provided on said mirror housing (22);

a sub housing (23) having a rear edge rearwardly positioned in said folded condition to extend in the lateral direction, said rear edge being rotatably connected with said rear edge of said mirror housing (22);

liquid crystal display means (38) retained by said sub housing (23) to be capable of transmitting light; and

means (24, 25, 26) for retaining said three housings for selectively bringing the same into a folded condition in which

said mirror housing (22) and said sub housing (23) are positioned in a superposed manner, and an opened condition in which said mirror housing (22) is downwardly inclined with respect to said main housing (21) and said sub housing (23) is positioned to be opened at a predetermined angle with respect to said mirror housing (22),

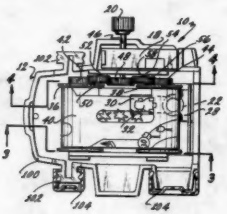
whereby the light from above said sub housing (23) is transmitted through said liquid crystal display means (38) of said sub housing (23) to be reflected by said mirror (31) of said mirror housing (22) to enable observation of the content of said liquid crystal display means (38) in said opened condition.

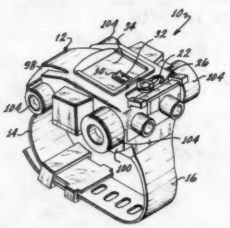
4,589,660

MINIATURE ACTION TOY

Akio Tsuzuki, Tokyo, Japan, assignor to Tomy Kogyo, Co. Inc., Tokyo, Japan

Filed Jun. 14, 1985, Ser. No. 745,313
Int. Cl.[4] A63F 9/14
U.S. Cl. 273—1 GA **7 Claims**





1. A miniature action toy which comprises:

a housing;

a windup motor located in said housing, said motor having an output gear, said motor including a control pawl and a ratchet wheel, said control pawl pivotally mounted in association with said ratchet wheel so as to engage and disengage with said ratchet wheel in response to pivoting of said pawl to control said motor;

a first and second spool located in said housing in operative association with said output gear so as to be rotated by said output gear;

an indicia carrier strip operatively attached to each of said first and said second spools, said indicia carrier strip winding from one of said first and said second spools to the other of said first and said second spools in response to rotation of said spools by said output gear;

said indicia carrier strip located in said housing in a position such that a continuously changing portion of said indicia carrier strip is visible to the operator of said toy as said indicia carrier strip winds from one of said spools to the other of said spools;

a first control element positioned in association with said indicia carrier strip, said first control element slideably mounted on said housing so as to slide under the influence of the operator of said toy laterally side to side across the indicia carrier strip and further up and down away from and towards said indicia carrier strip;

a second control element positioned in operative association with said first control element and said control pawl, said second control element pivotally mounted on said housing, said second control element including a pawl locking element;

biasing means associated with said second control element, said biasing means biasing said second control element against said first control element to move said first control element away from said indicia strip and to engage said pawl locking element against said pawl to lock said pawl, said pawl in turn locking said motor and said output gear;

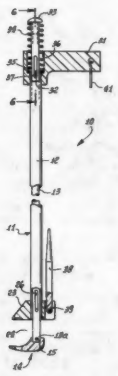
said first control element, in moving toward said indicia carrier strip, moving said second control element against the bias of said biasing means and disengaging said pawl locking element from said pawl to unlock said motor whereby said output gear rotates said spools.

4,589,661

GOLF BALL AND TEE MANIPULATING APPARATUS

George B. Attig, 642 Calfax Ct., Goleta, Calif. 93117

Filed Aug. 2, 1984, Ser. No. 637,130
Int. Cl.[4] A63B 57/00
U.S. Cl. 273—32.5 **9 Claims**



1. Golf ball and tee manipulating apparatus, comprising:

(a) vertically elongated shaft means,

(b) a claw carried on the lower end of the shaft means and having tines, to receive and support the head portion of a golf ball tee, generally between the tines,

(c) a holder carried by the shaft means to project sidewardly above the claw and form therewith a space to receive a golf ball at one side of the shaft means, with the ball retained between the holder and the head of the tee, whereby downward force is transmissible from the shaft means to the holder, and then through the ball to the tee to insert the tee in the ground,

(d) and adjustment means carried on an upper end portion of the shaft means for effecting relative vertical displacement of the holder and claw and to allow sideward release of the holder and claw from the ball and tee,

(e) said shaft means including relatively vertically movable outer and inner shafts respectively carrying the holder and claw,

(f) said adjustment means including a handle rigidly carried on said outer shaft, and an upwardly biased pusher rigidly carried on said inner shaft proximate said handle, said handle being attached to and projecting laterally away from said outer shaft, at one side thereof, and said inner

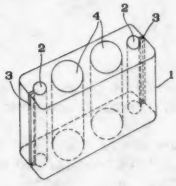
shaft and pusher projecting above the levels of said outer shaft and handle to be manually pressed down when a user's hand grips said handle, thereby to relatively move said claw, relative to said holder.

4,589,662

PLUG FOR DAMPING VIBRATIONS OF TENNIS RACKET CORDS

Aldo M. Robaldo, Corso Francia 33, 10138 Turin, Italy

Filed Oct. 31, 1984, Ser. No. 666,660
Claims priority, application Italy, Nov. 16, 1983, 53.935/83[U]
Int. Cl.[4] A63B *49/00*
U.S. Cl. 273—73 D 2 Claims



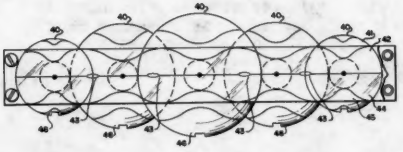
1. A vibration damping plug for tennis racket cords compising a flat one piece body of parallelepiped geometrical shape and resilient material, said body including a pair of outer channel means having parallel axes and a pair of slots to permit the body to be inserted between said cords and thereby resiliently connect the cords, said body further including a pair of inner hole means having parallel axes located in the same plane with the axes of said channel means for increasing the resilient effect of the material to make said body more resilient between said channel means to accommodate various types of tennis rackets.

4,589,663

GEAR-BASED MECHANICAL PUZZLE

Slobodan Doroslovac, 2731 Smith Rd., Akron, Ohio 44313

Filed Aug. 23, 1984, Ser. No. 643,439
Int. Cl.[4] A63F *9/08*
U.S. Cl. 273—155 9 Claims



1. A mechanical puzzle comprising at least four flat gears with markings wherein:

said gears are disposed in the same or parallel planes and interlocked so as to turn in unison; and

said puzzle has means for aligning said markings or said gears with each other, or with static markings or both; and

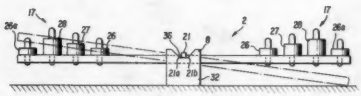
said puzzle also has means for disengaging some of said gears, said disengaging means being in the form of cut-outs provided on at least one of each pair of interlocked gears such that when said cut-outs are rotatably aligned with adjacent gears, said adjacent gears will be out of physical contact and capable of independent rotation.

4,589,664

TILTABLE BOARD GAME APPARATUS

Jack B. Slimp, Jr., 8715 Jackson Ave., Manassas, Va. 22110

Continuation-in-part of Ser. No. 275,995, Jun. 22, 1981, abandoned, which is a continuation-in-part of Ser. No. 63,583, Aug. 3, 1979, abandoned, which is a continuation-in-part of Ser. No. 833,284, Sep. 14, 1977, Pat. No. 4,200,292. This application Dec. 20, 1983, Ser. No. 563,571
Int. Cl.[4] A63F *3/02*
U.S. Cl. 273—258 38 Claims



1. An amusement device comprising a generally coplanar rectangular board that has a central balancing axis which divides the board into two opposite portions, a plurality of playing pieces for said board, support for said board comprising protrusions at the center of each longer side of the board, each said protrusion being perpendicular to the longitudinal axis of said board and extending laterally outwardly of said board from opposite sides thereof, level supporting means positioned laterally adjacent said longer sides receiving said protrusions and supporting said board, said protrusions each adapted to engage said supporting means on at least two longitudinally spaced points included on the bottom of said protrusions relative to said board located equal distances from and about level with a line perpendicular to said longitudinal axis of said board and coincident with the center of gravity of said board together with said playing pieces thereon in position to start game play, said board being tiltable with respect to said spaced points and said level supporting means from a balanced neutral, substantially horizontal position to a tilted position in which one said portion is elevated above the other said portion and said other lower portion bears against an underlying surface, said plurality of playing pieces being in categories of different weights and said portions having spaces disposed only in rows parallel to said line, said rows being spaces at an equal distance apart longitudinally, each of said spaced adapted to receive one of said playing pieces, each said portion having at least one designated zone of spaces and the number of spaces on each said portion being equal, said board being tilted about said spaced points in response to a sufficiently uneven distribution of pieces on either said portion relative to the opposite said portion whereby once said board has commenced to tilt by reason of said uneven distribution the moment on the down side is not decreased and said board continues to tilt until reaching said surface and whereby when in the absence of said uneven distribution tilting of said board is commenced by reason of smoething extraneous thereto, said board does not naturally continue to tilt but returns to its substantially horizontal position so that there is substantially no ambiguity in the game play on whether or not said board is tilted in response to a sufficiently uneven distribution of pieces thereon.

4,589,665

FLUOROCARBON RESIN SEAL AND METHOD OF MAKING SAME

Yoshio Arai, 1400, Kamihongo, Matsudo-shi, Chiba-ken, and Kikuei Mukasa, Urawa, both of Japan, assignors to Yoshio Arai, Matsudo, Japan

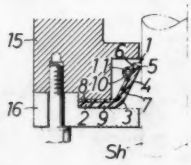
Division of Ser. No. 866,944, Jan. 4, 1978, Pat. No. 4,190,258. This application Nov. 30, 1978, Ser. No. 964,908
Int. Cl.[4] F16J *15/32*
U.S. Cl. 277—1 4 Claims

1. A method of making a radial seal of fluorocarbon resin consisting essentially of:

(a) slitting an annular sheet of fluorocarbon resin to form a

radial slit extending from either the inner or outer peripheral edge thereof to the vicinity of the other peripheral edge in parallel to the opposite surfaces of said annular sheet;

(b) inserting an annular elastic member into said slit in said annular sheet at a location adjacent to the closed end of said slit; and



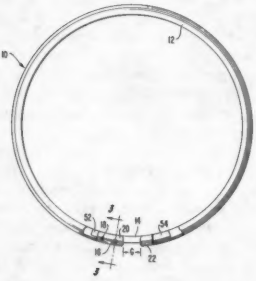
(c) shaping said annular sheet into an integral seal formation including a radially extending annular flange portion and a lip portion extending from said flange portion at an angle thereto through the intermediary of a flex section defined between said flange and lip portions, said lip portion having said annular elastic member automatically positioned therein.

4,589,666

SLIP JOINT ASSEMBLY FOR A SPLIT RING SEAL

Horace P. Halling, Laurel, Md., assignor to Pressure Science Incorporated, Beltsville, Md.

Filed Jul. 25, 1985, Ser. No. 758,713
Int. Cl.[4] F16J *9/18*
U.S. Cl. 277—200 **18 Claims**



1. A ring seal comprising:

a split ring having first and second ends defining a gap,

said split ring having a resilient transverse cross section;

means for bridging said gap,

said bridging means including first and second connecting members, each of said connecting members bridging said gap and having first and second ends, said connecting members having overlapping portions which are slidable transverse to each other;

said connecting elements being received in said split ring cross section with said first ends of said connecting elements being located inward of said split ring first end, and said second ends of said connecting elements being located inward of said split ring second end; and

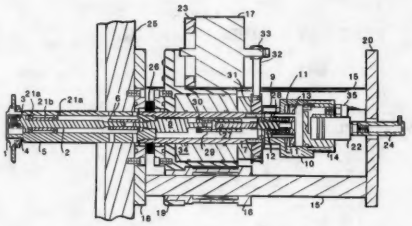
means for rigidly coupling the first ends of said connecting elements to said split ring first end, the second ends of said connecting elements being slidable relative to said split ring second end.

4,589,667

VACUUM COMPATIBLE COLLETING SPINDLE

Robert J. Lawton, Boise, Id., assignor to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 16, 1984, Ser. No. 661,544
Int. Cl.[4] B23B *31/40*
U.S. Cl. 279—2 A **3 Claims**



1. Apparatus for releasably engaging and coupling rotational motion to a chassis in a vacuum deposition chamber, said apparatus comprising:

a major shaft transversely slideably and rotationally mounted through a vertical wall of said vacuum chamber for releasably engaging and coupling rotational motion to said chassis from outside the chamber to inside the chamber, said major shaft including a bore parallel to the major shaft's major axis extending the length of the major shaft and a protruding rim along a portion of the periphery of a first end of the major shaft, said first end disposed within said chamber;

a minor shaft disposed within said bore of the major shaft, said minor shaft including an eccentrically-mounted bearing at one end, said eccentrically-mounted bearing extending from said first end of the major shaft, the centerline of said minor shaft displaced from the centerline of said major shaft such that rotation of the minor shaft relative to the major shaft causes the distance between the centerline of the eccentrically-mounted bearing and the centerline of the major shaft to vary from a minimum distance to a maximum distance; and

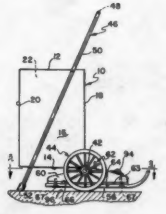
rotational means fixedly attached to a second end of the major shaft, said rotational means coupled to the minor shaft for rotating said minor shaft relative to the major shaft.

4,589,668

WHEELED CART WITH REMOVABLE SKIS

Edwin H. Mares, 3641 W. 31st St., Chicago, Ill. 60623

Filed Jan. 20, 1984, Ser. No. 572,559
Int. Cl.[4] B62B *13/18, 1/20*
U.S. Cl. 280—8 **4 Claims**



1. A cart for use on a bare or a snow covered surface comprising, in combination, a cart having a supporting frame, an elongated axle mounted on the frame and below the frame, said

axle having opposite end portions extending outwardly from the frame, a pair of wheels, one wheel of said pair being mounted on each end portion of the axle, said wheels being rotatable with respect to the frame and having perimeters adapted to ride on the bare surface and sink into a snow covered surface, an elongated ski having a substantially flat bottom surface adapted to ride on a snow covered surface, means attached to the ski for pivotally mounting the ski on the axle with the axis of elongation of the ski disposed in a plane normal to the axis of elongation of the axle, said mounting means comprising a block having a flat surface and a second surface opposite the flat surface, the flat surface being mounted on the ski opposite the bottom surface of the ski, said block having a recess extending in the second surface to accommodate the axle, and a plate translatably mounted on the second surface, said plate being translatable into a first position in which the plate extends over the recess to retain the axle in the recess and said plate being translatable to a second position remote from the recess, said mounting means including means for mounting a shim between the block and the ski for selecting the distance between the axle and the ski, said mounting means positioning the ski bottom surface remote from the axle and the combined center of gravity of said ski and said mounting means being disposed in a plane traversing the axis of elongation of the axle and normal to the axis of elongation of the ski, the distance between the axle and the bottom surface of the ski being between one-half inch and three inches less than the radius of the wheels, whereby the ski depends from the axle and is adapted to ride above a bare surface and engage a snow covered surface.

4,589,669

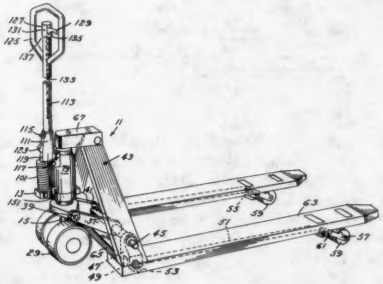
PALLET TRUCK WITH HYDRAULIC LIFT

Tuval Kedem, Miami, Fla., assignor to Equipment Company of America, Hialeah, Fla.

Division of Ser. No. 313,411, Oct. 26, 1981, Pat. No. 4,497,501. This application Oct. 24, 1984, Ser. No. 664,452

Int. Cl.⁴ B62D *21/18*

U.S. Cl. 280—43.12 **23 Claims**



1. In a pallet truck hydraulic jack having

a base plate mounting an upright lift cylinder having a reciprocal lift rod and piston means and a pump cylinder having a pump oulet and a manually reciprocal pump piston projecting therefrom;

a hydraulic control mechanism comprising a pivot axle secured to and depending from said base plate having an elongated bore extending axially of and communicating with said lift cylinder;

a plunger piston positioned within and projecting from said bore, through said base plate and at one end being secured to said piston means;

there being a first passage in said base plate interconnecting said pump cylinder outlet and said pivot axle bore;

a reservoir mounted upon said base plate containing a hydraulic fluid and having a first outlet communicating with said first passage for feeding hydraulic fluid into said pump cylinder upon its upward suction stroke;

a first valve means adjacent said first passage blocking pressurized hydraulic fluid from said reservoir first outlet;

downward movement of said pump piston feeding pressurized hydraulic fluid to said bore thereby lifting said plunger piston and said lift cylinder piston means and rod;

said reservoir having a second outlet;

there being a second passage in said base plate at one end communicating with said second outlet and at its other end communicating with said lift cylinder;

upward movement of said lift cylinder piston means drawing hydraulic fluid from said reservoir into said lift cylinder.

4,589,670

CONVERTIBLE TRUCK/TRAILER ASSEMBLY AND METHOD

Willard L. Sweetin, 5956 Fazon Rd., Bellingham, Wash. 98226

Filed Jun. 10, 1983, Ser. No. 503,704

Int. Cl.⁴ B60P *1/28*; B62D *53/04*

U.S. Cl. 280—405 R **37 Claims**

1. A trailer adapted to be connected to a towing vehicle having a hitch, in a manner to have a travel configuration where the trailer is adapted to travel over routes where there are limitations as to the weight which can be carried by ground engaging wheels of the vehicle, and a maneuvering configuration where the trailer is adapted to perform maneuvers, such as backup maneuvers, effectively, said trailer having a front end and a rear end, and comprising:

(a) a rear set of ground engaging wheels;

(b) a front set of steerable ground engaging wheels;

(c) an adjustable reach having a front connecting portion adapted to engage a hitch of a rowing vehicle and a rear portion connected to said trailer, said reach having an extended position where the trailer is spaced further from a towing vehicle at a sufficient distance to meet route weight limitations when in its traveling configuration and a retracted position where the trailer is positioned more closely to the truck;

(d) a lifting and securing means operatively connected to the trailer to raise the forward set of wheels from a ground engaging position and to secure said reach in its retracted position to the trailer in a manner to resist downward rotation of the front end of the trailer relative to the reach so as to keep said front set of wheels out of ground engagement, thus placing the trailer in its maneuvering configuration; whereby said trailer in its travel configuration can carry relatively high loads, and said trailer can be arranged in its maneuvering configuration to accomplish more difficult maneuvers, such as backup maneuvers.

4,589,671

LOAD CARRYING ROAD VEHICLES

Thomas T. Boughton, Amersham, England, assignor to T. T. Boughton & Sons Ltd, Great Britain

Filed Dec. 6, 1984, Ser. No. 678,716

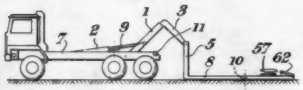
Claims priority, application United Kingdom, Dec. 7, 1983, 8332584

Int. Cl.⁴ B62D *53/08*

U.S. Cl. 280—433 **9 Claims**

1. A load-carrying road vehicle comprising: a transport frame; rollers at or near the rear of the vehicle; a hydraulically controlled lifting arm pivotally mounted on the vehicle; and a jib at the forward end of a hydraulically controlled member

movable with respect to said lifting arm, said jib being provided with a hook adapted to cooperate with an upstanding member at the forward end of the transport frame, and the jib, the hydraulically controlled member and the lifting arm being arranged to move the transport frame on said rollers, wherein a plurality of anchor members are provided on the transport



frame, wherein locking means are provided on the vehicle chassis to cooperate with said anchor members to positively restrict movement of the frame rearwardly with respect to the vehicle chassis, and wherein coupling means are mounted on said frame adjacent to the rear end thereof for coupling a trailer to said vehicle.

4,589,672

IMPROVEMENT IN OR RELATING TO TRAILERS

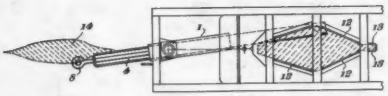
John R. Dickens, Chesham, England, assignor to Scottorn Trailers Limited, Great Britain

Filed Mar. 15, 1984, Ser. No. 589,771

Claims priority, application United Kingdom, Mar. 30, 1983, 8308766

Int. Cl.[4] B60D *1/00*

U.S. Cl. 280—478 B **8 Claims**



1. A trailer having a member pivotally mounted about a pivot axis at the forward end thereof, a draw-bar by which the trailer is adapted to be drawn when coupled to a vehicle and which is axially movable with respect to said member, guide means adapted to hold said draw-bar on the fore-and-aft axis of the trailer when said draw-bar is in its forwardmost position relative to said member, and to allow the draw-bar limited lateral movement about the pivot axis of said member when the draw-bar is in a position to the rear of its forwardmost position, and manually releasable means to lock the draw-bar in its forwardmost position relative to the pivotally-mounted member.

4,589,673

RELEASE MECHANISM FOR A SKI BINDING

Jean-Pierre Dimier, Rumilly, and Roger Pascal, Annecy-le-Vieux, both of France, assignors to Salomon S.A., Annecy, France

Filed Mar. 1, 1983, Ser. No. 471,168

Claims priority, application France, Feb. 3, 1982, 82 03973

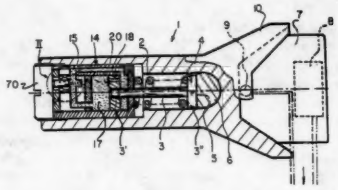
Int. Cl.[4] A63C *9/08*

U.S. Cl. 280—630 **60 Claims**

1. A release mechanism for a binding that is pivotable about a fixed axis, said mechanism comprising:

(a) a first release means for producing an initial release retention force on said binding to cause said binding to resist pivoting about said fixed axis; and

(b) a second release means for continuously increasing said initial release retention force, said second means compris-



ing an electronic control mechanism for cntrolling the amount of increase in said initial release retention force.

4,589,674

APPARATUS FOR FACILITATING A LONGITUDINAL ADJUSTMENT OF SKI-BINDING PARTS

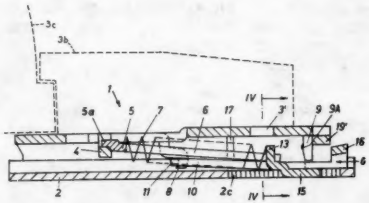
Erwin Krob, and Helmut Bauer, both of Vienna, Austria, assignors to TMC Corporation, Baar, Switzerland

Continuation of Ser. No. 380,850, May 21, 1982, abandoned. This application Jun. 25, 1985, Ser. No. 748,386

Claims priority, application Austria, Jun. 12, 1981, 2621/81

Int. Cl.[4] A63C *9/00*

U.S. Cl. 280—633 **15 Claims**



1. An apparatus for facilitating longitudinal adjustment on a ski of a ski-binding part which is adapted to releasably secure a ski boot on the ski, comprising: a guide rail which is adapted to be fastened to the ski, has two laterally spaced guide tracks, and has longitudinally extending toothed bars arranged between the guide tracks; a toothed locking member which can engage the toothed bars and is arranged on a slide plate, the slide plate being disposed below a guide plate which is movably supported on the guide rail, the guide plate being adapted to have the ski-binding part mounted thereon; and a compression spring which is cooperable with the slide and guide plates and urges the guide plate toward the ski boot relative to the slide plate; wherein the guide plate has in the region of its end remote from the ski boot two downwardly extending projections; wherein the slide plate is pivotally supported on the guide plate and has two shoulders at an end thereof which is adjacent the toothed locking member, the shoulders, in the released position of the apparatus, engaging the projections on the guide plate under the urging of the compression spring; and wherein for effecting the movable support of the slide plate on the guide plate, the slide plate has an upwardly bent portion having a hole therein, the hole in the upwardly bent portion of the slide plate slidably receiving a rod which is supported on the guide plate and on which is supported the compression spring.

4,589,675
ACTIVE SUSPENSION SYSTEM

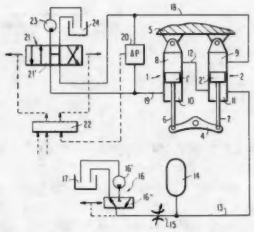
Dieter Braun, and Herbert Mehren, both of Stuttgart, Fed. Rep. of Germany, assignors to Daimler-Benz Aktiengesellschaft, Fed. Rep. of Germany

Filed Mar. 5, 1984, Ser. No. 585,928

Claims priority, application Fed. Rep. of Germany, Mar. 7, 1983, 3308011

Int. Cl.⁴ B60G *11/26*

U.S. Cl. 280—707 **12 Claims**



1. An active suspension system for motor vehicles, accepting static as well as dynamic loads, comprising a hydraulic suspension system, preferably designed as a multiple piston and cylinder arrangement, having at least three chambers, a program-controlled regulating device which regulates the pressure in at least one first hydraulic chamber of the suspension device which expands upon extension of the suspension as well as a second hydraulic chamber which expands upon compression of the suspension as a function of operating or driving states, characterized in that the first and second hydraulic chambers undergo equal volume changes during suspension travel, and wherein an additional chamber of the suspension system, which expands upon extension of the suspension, is subjected to a constant pressure which is essentially independent of chamber volume and serves to compensate the static load.

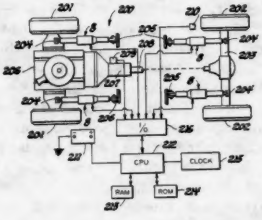
4,589,676
ADAPTIVE RIDE CONTROL FOR MOTOR VEHICLE

Kenneth R. Meloche, Warren; James G. McLeish, Sterling Heights, both of Mich.; Douglas R. Bach, Dayton, and Harry C. Buchanan, Jr., Spring Valley, both of Ohio, assignors to General Motors Corporation, Detroit, Mich.

Filed Dec. 13, 1984, Ser. No. 681,312

Int. Cl.⁴ B60G *17/00*

U.S. Cl. 280—707 **5 Claims**



1. In a wheeled vehicle having sprung and unsprung masses connected by a variable damper, ride control apparatus effective to adjust the damping of said variable damper adaptively in response to road conditions during vehicle operation, the apparatus comprising, in combination:

sensing means responsive to the vertical separation between the sprung and unsprung masses to generate periodic signals thereof;

means responsive to said signals to count the road caused oscillations of said vertical separation during a predetermined time period and generate a first number therefrom;

means responsive to said signals to sense the maximum range of said vertical separation during the predetermined time period and generate a second number therefrom;

lookup memory means effective to store damping control numbers as a function of predetermined values of said first and second numbers; and

means effective, after said predetermined time period, to obtain from said lookup memory means a damping control number corresponding to said first and second numbers and adjust the variable damper in response to said damping control number, whereby the ride character of the vehicle is adapted to actual road conditions.

4,589,677
SUSPENSION FOR A RIGID AXLE FOR VEHICLES

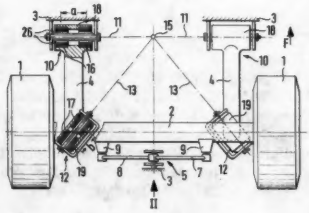
Wolfgang Matschinsky, Munich, Fed. Rep. of Germany, assignor to Bayerische Motoren Werke A.G., Fed. Rep. of Germany

Filed Sep. 17, 1984, Ser. No. 651,322

Claims priority, application Fed. Rep. of Germany, Sep. 17, 1983, 3333706

Int. Cl.⁴ B60G *9/02*

U.S. Cl. 280—726 **12 Claims**



1. A suspension of a rigid axle for vehicles, comprising axle body means extending essentially transversely to the driving direction, a wheel supported at each of the two ends of the axle body means, two longitudinal guide members being laterally offset with respect to each other and operatively connecting the axle body means at a fixed vehicle part, lateral guide means operatively connecting the axle body means at the fixed vehicle part and guiding the same with respect thereto, the longitudinal guide members being bending- and torsion-resistant longitudinal arm means which are pivotally connected at the fixed vehicle part in a first rubber-elastic-like pivot bearing means having a relatively wide bearing base and arranged approximately transversely and horizontally, said longitudinal arm means being operatively connected with the torsion-rigid axle body means by way of a second rubber-elastic-like pivot bearing means having a relatively wide bearing base, whose pivot axes extend at an inclination as viewed in plan view, the pivot axes of said second pivot bearing means intersecting the pivot axes of the longitudinal arm means on the side of the body approximately in the vehicle center plane at least approximately in a point.

4,589,678
ANTI-ROLL SYSTEM FOR A VEHICLE

Mark A. Lund, Escondido, Calif., assignor to Allan J. Kuebler, Chula Vista, Calif., a part interest

Filed Mar. 19, 1985, Ser. No. 713,777

Int. Cl.⁴ B62D *9/02*

U.S. Cl. 280—772 **20 Claims**

1. An anti-roll system for a vehicle, comprising:

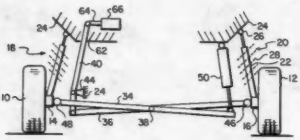
means for rotatably supporting a first wheel;

means for rotatably supporting a second wheel;

a first spring and damper assembly connecting the first wheel supporting means to a first side of a vehicle body;

a second spring and damper assembly connecting the second wheel supporting means to a second side of the body;

a first cross-bar having a first end and a second end, the first end being pivotally connected to the first wheel supporting means;



a second cross-bar having a first end and a second end, the first end being pivotally connected to the second wheel supporting means;

means for pivotally connecting the cross-bars intermediate their ends; and

control means operative during turning of the vehicle to exert forces on the cross-bars relative to the vehicle body to thereby oppose rolling of the vehicle body.

4,589,679

SAFETY STEERING COLUMN MADE OF FIBER-REINFORCED SYNTHETIC MATERIALS

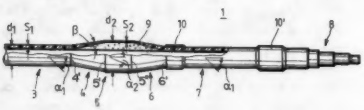
Peter Wackerle, Ottobrunn; Ralf-Thilo Schulz, Putzbrunn; Franz Sperber, Kolbermoor; Wolfram Koletzko, Rosenheim, and Wolfgang Prochaska, Munich, all of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung, Munich, Fed. Rep. of Germany

Filed May 30, 1984, Ser. No. 615,347

Claims priority, application Fed. Rep. of Germany, Jun. 11, 1983, 3321198

Int. Cl.[4] B62D *1/18*

U.S. Cl. 280—777 **9 Claims**



1. A safety steering column made of wound fiber-reinforced synthetic material, comprising a plurality of sections forming a body of rotational symmetry for facilitating a fiber winding operation said sections comprising a tubular torque input section (3) stiffened against bending and torsion for connection to a steering wheel hub, a tubular torque output section (7) stiffened against bending and torsion for connection of the steering column to a steering mechanism, a thin-walled, torsionally rigid and axially flexible intermediate section (5), said intermediate section having an outer diameter larger than said torque input and torque output sections, a first transition section (4) operatively interconnecting said torque input section to said intermediate section (5), and a second transition section (6) operatively interconnecting said intermediate section to said torque output section (7), all of said sections forming a one-piece would steering column structure, and wherein said first and second transition sections (4, 6) have a conical shape and a wall thickness which decreases linearly in the direction toward said intermediate section (5) for providing an improved buckling ability.

4,589,680

INSTALLATION FOR DISPLACING A BELT BAND

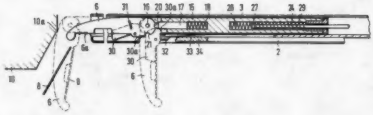
Franz Gürtler, Unterschleissheim, and Robert Wimmer, Ebersberg, both of Fed. Rep. of Germany, assignors to Bayerische Motoren Werke AG, Fed. Rep. of Germany

Filed Jan. 19, 1984, Ser. No. 572,020

Claims priority, application Fed. Rep. of Germany, Jan. 22, 1983, 3302163

Int. Cl.[4] B60R *22/00*

U.S. Cl. 280—801 **23 Claims**



1. An installation for the displacement of a belt band into a position favorable for being seized in motor vehicles, comprising guide rail means in a vehicle lateral wall, a guide means movable to and fro in the driving direction within the guide rail means, an entrainment means being operable during displacement thereof for engaging the belt band from behind and for transporting the belt band forwardly in the driving direction while projecting into the vehicle interior in a position approximately perpendicular to the guide rail means, and means for moveably retaining the entrainment means relative to the guide means.

4,589,681

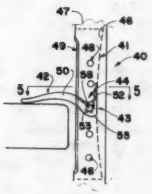
SKI POLE MODIFYING APPARATUS

John S. Erickson, 11201 SE. Third - 39G, Everett, Wash. 98204

Filed Nov. 8, 1983, Ser. No. 549,774

Int. Cl.[4] A63C *11/22*

U.S. Cl. 280—819 **8 Claims**

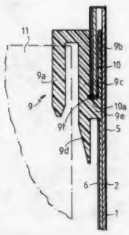


1. Ski pole modifying apparatus including a support portion, a hanger portion, a pivoting portion and a stabilizer portion; said support portion including an elongated main section, said main section being capable of disposition within a hollow ski pole intermediate the ends thereof, said support portion including a plurality of longitudinally spaced shaft supports; said hanger portion extending from said support portion, said hanger portion including an arm member with a free end, said arm member having a width several times the thickness thereof, said arm member being capable of extending generally perpendicularly from said main section; said pivoting portion including shaft means for changing the position of said hanger portion about a transverse axis through said ski pole from a position in which said free end of said arm member of said hanger portion is remote from said ski pole to a position in which said free end is disposed adjacent to said ski pole; said stabilizer portion retaining the position of said hanger portion with respect to said ski pole; whereby when said modifying apparatus is mounted on a ski pole, said hanger portion can be pivoted to a position so it can lay on a ski lift seat to enable a skier to rest his feet on ski pole baskets.

4,589,682
MOBILE BINDING

Francois Balland, 8 rue des Volontaires, 80500 Mont Didier, France

Filed Jul. 16, 1985, Ser. No. 755,715
Claims priority, application France, Jul. 20, 1984, 84 11832
Int. Cl.[4] B42D *17/00*
U.S. Cl. 281—46 3 Claims

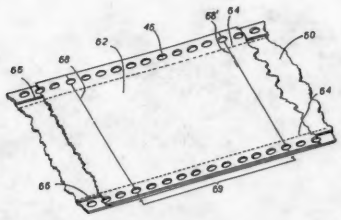


1. In a mobile binding comprising holding elements or S shaped clips and formed from two sheets 1 and 2 made from cardboard, or a similar semi rigid material, which extend over the whole length of the binding and which are bonded together, except at least in the end portions of the back, the inner sheet having an opening 8 in which one of the end legs of the S shaped element may be engaged, the other end being then engaged in the middle of the review to be bound, said holding elements are provided with a notch on the inner face of their part situated opposite the opening when they are in position in the binding, and it further comprises a plate which may be engaged in the opening between the two sheets of the back and which is provided with an outwardly turned flange adapted for engagement in the notches of said elements.

4,589,683
SELF RECEIPTING CONTINUOUS STATIONERY FOR POINT-OF-SALE TERMINAL

Peter J. M. Kearns, Cardiff, Wales, assignor to Burroughs Corporation, Detroit, Mich.

Filed Mar. 1, 1984, Ser. No. 585,080
Claims priority, application United Kingdom, Aug. 13, 1983, 8321862
Int. Cl.[4] B41L *1/20*
U.S. Cl. 282—11.5 A 20 Claims



1. Continuous, sprocket-aligned, friction driven fanfold self-copy printer stationery for maintaining a transaction record and for providing an automatic, detachable customer receipt in a point-of-sale terminal, said stationery comprising:

a base ply comprising regularly spaced transverse fold lines for defining the distance between each successive pair thereof as a transaction form;

a pair of lines of sprocket holes proximate to the edges of said base ply;

a detachable ply comprising first and second transverse separation lines in each transaction record proximate to said fold lines and further comprising a pair of longitudinal lines of weakening inboard of said two lines of sprocket holes; and

a pair of glue lines between said line of sprocket holes and said longitudinal weakening line on each side of said detachable ply for affixing said detachable ply to said base ply;

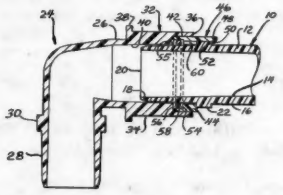
where a removable part of said detachable ply is removable from said base ply in each transaction form by the opening of a first of said pair of transverse separation lines, the tearing towards the second of said pair of transverse separation lines of said pair of longitudinal lines of weakening and the transverse tearing of the second of said pair of transverse separation lines, the part of the detachable ply, removed from each said transaction form being providable as a customer receipt;

said second one of said pair of transverse separation lines being spaced from the fold line at its respective end of said each transaction form, the part of said detachable ply intermediate between said second one of said pair of said transverse separation lines and said fold line at said respective end of said each transaction form of said second transverse separation line being affixed at one or more points to said base ply to support the tearing of said second transverse separation line.

4,589,684
ANESTHESIOLOGY CONNECTOR

Christopher Nowacki, and Alfred Brisson, both of Arlington Heights, Ill., assignors to Trutek Research, Inc., Arlington Heights, Ill.

Filed Oct. 11, 1983, Ser. No. 540,324
Int. Cl.[4] F16L *39/00*
U.S. Cl. 285—319 2 Claims



1. A female anesthesiology connector comprising a tubular body having a receiving end, said body having an axial bore extending therethrough, said body having a counterbore in said receiving end, a shoulder in said body between said bore and said counterbore, an insert ring having an inner end, said inner end having a counterbore, a sealing O-ring laid in said insert ring counterbore, said insert ring having its inner end secured within said body counterbore against said shoulder wherein said insert ring counterbore and said shoulder define an inwardly opening circumferential groove having said O-ring therein, and a lock finger on said insert ring having a free end extending longitudinally beyond said tubular body in readily accessible position for manual release, said finger having locking means adjacent said free end for locking engagement with a cooperating part on a male connector.

4,589,685
CHANGEABLE LABELLING SYSTEM

Allan Lazar, 1516 Baylor Ave., Rockville, Md. 20850

Filed Aug. 2, 1984, Ser. No. 637,154
Int. Cl.[4] B42D *15/00, 5/00;* B43L *1/12*
U.S. Cl. 283—81 8 Claims

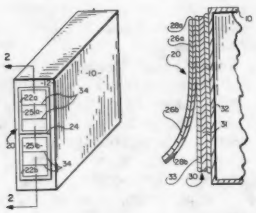
1. A labelling system for a video cassette or video cassette holder, wherein indicia recorded on the label can be changed as required, the labelling system comprising:

an impression layer having a first planar surface and a sec-

ond planar surface, the first planar surface defining a surface for recording indicia;

a flexible translucent adhering sheet overlaying the first planar surface of the impression layer which when pressed against the first planar surface the translucent adhering sheet adheres thereto leaving visible indicia, when the translucent adhering sheet is separated from the first planar surface of the impression layer the visible indicia disappears allowing additional indicia to be recorded.

the impression layer together with the flexibletranslucent



adhering sheet form at least two indicia recording surfaces wherein each indicia recording surface represents a segment on a corresponding video cassette;

erasure means for independently erasing each of the at least two indicia recording surfaces by separating the adhering sheet from the first planar surface of the impression layer; and

attaching means overlying at least a portion of the second planar surface of the impression layer, the attaching means is adapted and constructed to mount the labelling system on a spine of a video cassette or video cassette holder.

4,589,686

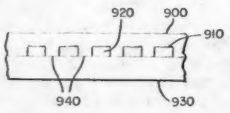
ANTICOUNTERFEITING METHOD AND DEVICE

Stephen P. McGrew, 12615 Boulder St., Boulder Creek, Calif. 95006

Continuation-in-part of Ser. No. 314,553, Oct. 26, 1981, which is a continuation-in-part of Ser. No. 203,563, Nov. 5, 1980, abandoned. This application Jun. 28, 1982, Ser. No. 393,107

Int. Cl.[4] B42D *15/00*

U.S. Cl. 283—85 **4 Claims**



1. A method of making a security device, comprising:

preparing a diffractive pattern as a surface relief pattern;

applying embossable material to a substrate in such a way that said embossable material covers portions of said substrate and does not cover other portions of said substrate to form multiply connected regions of said embossable material on said substrate, said regions being of sufficient density of coverage that said embossable material appears substantially continuous to the unaided human eye;

embossing said surface relief pattern into said embossable material; and

coating said embossable material and substrate with a transparent material which binds firmly to said embossable material and portions of said substrate not covered with said embossable material.

4,589,687

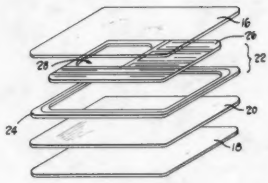
IDENTIFICATION CARD METHOD AND APPARATUS

Donald F. Hannon, Waite Hill, Ohio, assignor to Graphic Laminating Inc., Cleveland, Ohio

Filed Jul. 13, 1983, Ser. No. 513,300

Int. Cl.[4] B42D *15/00*

U.S. Cl. 283—94 **10 Claims**



1. An identification card comprising:

a flexible paper core to which identifying indicia can be affixed, said paper core including a layer of safety paper mounted to a layer of backing paper;

a polyester border which defines an inner surface that abuts and bounds an outer periphery of said paper core, said border having a thickness substantially the same as said paper core;

an opaque flexible polyester backing layer having an outer perimeter the same dimensions as an outer perimeter of said border and having a backing surface to which said paper core and polyester border are bonded; and

a polyester covering layer of sufficient transparency to allow said indicia to be viewed through said covering layer; said covering layer including a bonding surface to bond said border and safety paper core to said covering layer thereby sealing said paper core.

4,589,688

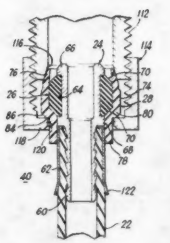
PLUMBING HOOKUP KIT

Dwight N. Johnson, Vista, Calif., assignor to Fillpro Products, Inc., Carlsbad, Calif.

Filed Sep. 2, 1981, Ser. No. 298,646

Int. Cl.[4] F16L *25/00*

U.S. Cl. 285—12 **17 Claims**



1. A plumbing hookup kit for connecting one of a plurality of different water supply connections to one of a plurality of different water fixture connections, the different supply and fixture connections including male threaded fittings of different sizes and types and mating threaded coupling nuts of different sizes and types, the coupling nuts each including an apertured wall, said hookup kit comprising:

a length of flexible tubing;

a pair of generally cylindrical terminals, means for attaching one of said pair of terminals to each end of said tubing;

a pair of flexible resilient sealing rings each engageable in encircling relation around one of said terminals each sealing ring including a generally cylindrical outer wall, each

said sealing ring including at least one sloped end wall; said end wall sloped relative to said outer wall, and

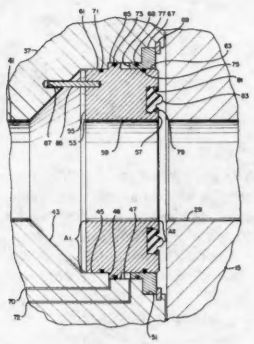
a plurality of different adaptor sleeves each having an inside configuration corresponding to said terminal and seal ring and an outside configuration permitting it to be received in at least one size coupling nut, said inside configuration including a portion complementary to and adapted to engage said sloped end wall of said sealing ring, whereby upon connecting a water supply connection to a water fixture connection each said sealing ring sealingly encircles each said terminal, each said adaptor sleeve encircles said sealing rings and sealingly engages said water fixture connection, each said coupling nut mates with said water fixture connection and encircles an adaptor sleeve maintaining said adaptor sleeve in engagement with said sealing ring and said said water fixture connetion to provide a leak proof connection.

4,589,689

ENERGIZED SEAL FOR UPPER TERMINATION

A. Michael Regan, Huntington Beach, Calif., assignor to Hughes Tool Company, Houston, Tex.

Filed Apr. 16, 1984, Ser. No. 600,662
Int. Cl.[4] F16L *35/00, 17/00*
U.S. Cl. 285—24 **4 Claims**



1. In a fluid connection system for a subsea well having a termination head connected to a riser string, a termination housing having a receptacle which releasably receives the termination head, the termination head and termination housing having passages traverse to the axis of the riser string that register with each other for communicating fluids between the floating vessel and riser string, the improvement comprising in combination:

hose means rigidly mounted to the housing for communicating fluids in the passage of the housing with the floating vessel;

an annular piston reciprocally carried in the passage of the housing and having a bore therethrough for transmitting fluid, the piston having forward and rearward ends;

annular seal means for sealing the piston with the head when the piston is moved forwardly into contact with the head; and

fluid pressure means for moving the piston relative to the hose means and housing forwardly into sealing engagement with the head and rearwardly to allow the head to be moved from the housing;

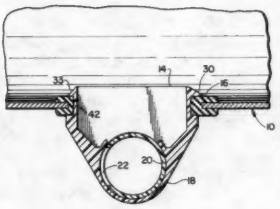
the rearward end of the piston being located within the housing passage and spaced forwardly of the hose means, the rearward end of the piston having a pressure area in communication with pressure of the fluid in the passage, the forward end of the piston having a pressure area located inwardly of the seal means that is in communication with the pressure of the fluid in the passage when the piston is in sealing engagement, the pressure area of the rearward end being greater than the pressure area of the forward end to provide a net forward force on the piston.

4,589,690

SEAL FOR IRRIGATION VALVE

Guy A. Meuleman, Rupert, Id., assignor to Aqua Control, Inc., Rupert, Id.

Continuation-in-part of Ser. No. 511,657, Jul. 5, 1983, Pat. No. 4,543,990. This application Feb. 26, 1985, Ser. No. 705,534
Int. Cl.[4] F16L *3/04*
U.S. Cl. 285—162 **8 Claims**



1. A seal structure for forming a watertight connection between a first elongated opening through the wall of a pipe and a conduit leading to a valve comprising the combination of

a gasket comprising

a unitarily molded, generally rectangular body of elastomeric material having front and back surfaces and a thickness at least three times the thickness of the pipe wall,

a continuous groove extending inwardly from the periphery of said body to receive the edges of the pipe wall defining the first opening, and

a second opening extending axially through said body forming first, second, third and fourth walls around said second opening, said first wall being significantly wider in a radial direction than the opposite one of said walls; and

a conduit having

a hollow interior opening at the distal end thereof,

a generally rectangular outer surface shaped and dimensioned to be at least as large as said second opening before installation,

first and second flanges protruding laterally from opposite sides of said conduit adjacent the distal end thereof, each of said flanges having a surface perpendicular to the adjacent portion of the outer surface of said conduit with the flange at one side being significantly radially longer than the flange at the opposite side, and

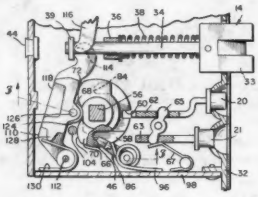
a stop surface at one end of said conduit, the distance between said stop surface and said flanges being no greater than the thickness of said body;

whereby said conduit can be coupled to said pipe by placing said gasket in said first opening with said first wall adjacent one side of said first opening and said back wall facing the interior of said conduit, inserting said longer flange on said conduit through said second opening and adjacent the inner surface of said first wall of said gasket, pushing said conduit toward said first wall to elastically compress said first wall, and inserting the other flange so that the stop surface is adjacent the outer, front surface of said gasket.

4,589,691
LEVER HANDLE MORTISE LOCK

William R. Foshee, and Kevin Carey, both of Indianapolis, Ind., assignors to Best Lock Corporation, Indianapolis, Ind.

Filed May 4, 1984, Ser. No. 607,007
Int. Cl.[4] E05C *1/16*
U.S. Cl. 292—165 18 Claims

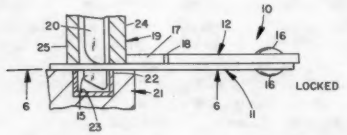


1. A mortise lock comprising:
a case,
a latch bolt,
first spring means for yieldably biasing the latch bolt from a retracted position to a projected position,
a retraction lever for retracting the latch bolt,
means for pivotally mounting the retraction lever in the case to permit the retraction lever to be pivoted from a first position to a second position to cause the latch bolt to move toward its retracted position,
second spring means for yieldably biasing the retraction lever toward its first position such that the latch bolt remains in its projected position,
inside and outside operating hubs coaxially aligned and independently rotatably mounted in the case, each operating hub being rotatable in at least one direction toward a rotated position and including at least one hub camming surface and cam means for engaging the retraction lever to cause said lever to pivot and retract the latch bolt in response to rotation of one of the inside and outside operating hubs, and
third spring means for yieldably biasing at least one of the operating hubs to return from a rotated position, the third spring means including at least one bias arm having a bias arm camming surface, and means for pivotally mounting the at least one bias arm in the case to permit the bias arm camming surface to operate on a selected one of the hub camming surfaces to subsequently cause the retraction lever to pivot toward its first position to move the latch bolt to its projected position.

4,589,692
PORTABLE DOOR LOCK

Elihu K. Boyd, Rising Sun, Md., assignor to David R. Hamilton and Barbara J. Hamilton, both of Oxford, Pa.

Filed Jun. 13, 1984, Ser. No. 620,340
Int. Cl.[4] E05C *19/18*
U.S. Cl. 292—297 10 Claims

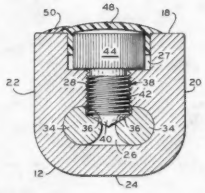


1. A portable lock for a door of the type cooperating with a jamb, the door having inner and outer sides and further having a retractable bolt, and the jamb having a keeper provided with a recess to receive the retractable bolt, and wherein the lock is reversible for right-hand and left-hand doors and will accommodate various thicknesses of doors within a given range; said lock comprising a relatively-thin locking strap adapted to be fitted between the door and the jamb, the strap having respective first and second end portions, bolt means on the first end portion of the strap and adapted to be received within the recess in the keeper when the door is in its open position, and a locking dog pivotably mounted on the second end portion of the strap about a pivot axis transverse to the plane of the strap, the dog having an outer arcuate face which is eccentric with respect to the pivot axis, and the dog being substantially symmetrical about a line drawn from the pivot axis to the outermost portion of the arcuate face, thereby separating the arcuate face into respective curved portions on either side of the symmetrical line, one of the portions engaging the door when the lock is used on a right-hand door, and the other portion engaging the door when the lock is used on a left-hand door.

4,589,693
REUSABLE LOCKING DEVICE

Thomas D. Kennedy, 7108 Blue Beach, Fort Wayne, Ind. 46815

Filed Sep. 8, 1982, Ser. No. 530,205
Int. Cl.[4] B65D *33/34*
U.S. Cl. 292—315 11 Claims



1. A reusable tamper proof locking device comprising:
a body including a first hole and an aperture therein, said hole and aperture intersecting within said body;
a shackle having a loop portion and two substantially parallel ends, said ends each including an indentation therein, said ends including said indentations received in said aperture;
locking means including an engaging portion disposed in said hole, said engaging portions being complimentary and lockably engaged with said indentations whereby said ends are restrained from axial movement in said aperture;
said locking means further including means for disengaging said engaging portion from said indentations thereby enabling removal of said shackle ends from said aperture;
said body further including a simulated lock cylinder and key slot; and
means for concealing said disengaging means and comprising a second hole for receiving said disengaging means and a cap for covering said second hole.

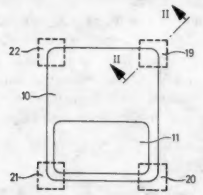
4,589,694
WATER DRAINING SYSTEM FOR FRAMES OF MOTOR VEHICLE SLIDING ROOFS AND SIMILAR DEVICES, AND A METHOD OF MAKING SAME

Michael Kempter, Munich, Fed. Rep. of Germany, assignor to Webasto-Werk W. Baier GmbH & Co., Fed. Rep. of Germany

Filed Aug. 24, 1984, Ser. No. 644,015
Claims priority, application Fed. Rep. of Germany, Sep. 27, 1983, 3334896
Int. Cl.[4] B60J *7/04*
U.S. Cl. 296—213 16 Claims

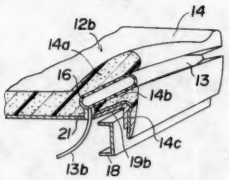
1. A water draining system for frames of motor vehicle sliding roofs, tiltout roofs and similar devices of the type having at least one water drain pipe for draining water from a gutter, formed by the frame and surrounding an opening in the roof at least on part of its circumference, via an aperture in the

gutter of the frame, wherein the water drain pipe is molded directly onto the frame, and wherein the material of the water



draining pipe surrounds an edge of the aperture on both inner and outer sides thereof.

4,589,695
VEHICLE SEAT
Hiroyuki Isono, Akishima, Japan, assignor to Tachikawa Spring Co., Ltd., Tokyo, Japan
Filed Mar. 28, 1984, Ser. No. 594,313
Int. Cl.[4] A47C *3/00*
U.S. Cl. 297—284 **9 Claims**



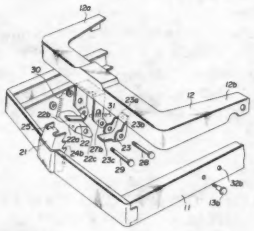
1. A vehicle seat of the type having pneumatically adjustable support regions comprising:

a seat frame including plural frame members which together bound an interior area;

at least one cushion member positioned in said interior area and supported by means of said seat frame, said cushion member having opposing pairs of side portions of a predetermined thickness which peripherally bound an upper support surface for supporting a seat occupant and a lower surface; wherein

predetermined ones of said side portions integrally include slitdefining means for defining at least one slit having an outer end opened to an exterior of said cushion member and a closed inner end spaced from said outer end and located interiorly of said cushion member, said slit extending between said outer and inner ends substantially parallel to said support surface of said cushion member subjeacent to an area of said support surface which is desired to be pneumatically adjustable, said slit-defining means for separating said cushion member into upper and lower portions which are in registry with said adjustable area of said upper surface; air bag means inserted into said at least one slit and being expansible upon introduction of pressurized air so as to responsively cause said upper portion of said cushion member to be displaced relative to said lower portion of said cushion member thereby adjusting said adjustable area of said support surface, and wherein said seat frame also includes plural support plates subjacently supporting said cushion member, each having one end fixed to a respective frame member and another free end which is positioned in said interior area such that each said support plate is extended into and terminates within said interior area so that said lower surface of said cushion member is in contact with and is supported by said plural support plates such that one of said support plates is in registry with said at least one slit and thus in registry with said support surface area.

4,589,696
ADJUSTMENT/ENGAGEMENT DEVICE IN A VEHICLE SEAT
Shigeru Kanai, and Masatatsu Kanai, both of Akishima, Japan, assignors to Tachikawa Spring Co., Ltd., Tokyo, Japan
Filed Jul. 12, 1984, Ser. No. 630,306
Int. Cl.[4] A47C *3/00*
U.S. Cl. 297—284 **6 Claims**



1. An adjustment/engagement device for use in a vehicle seat of the type including a fixed-position frame portion and a movable frame portion which is adjustable between raised and lowered height positions relative to said fixed-position frame portion, said device comprising:

a stopper bracket fixed to one of said fixed-position or movable frame portions and including a spaced-apart pair of position-determining members which together define plural pairs of engagement grooves which establish said raised and lowered positions of said movable frame portion in addition to establishing at least one intermediate position thereof, and said stopper bracket also including upper and lower engagement pieces formed on upper and lower edge portions, respectively, of said stopper bracket;

an inverted U-shaped bracket fixed to the other of said fixed-position or movable frame portions in a position so as to oppose said stopper bracket, wherein said U-shaped bracket includes a spaced-apart pair of mounting arms which define a corresponding pair of engagement surfaces;

lock bracket means jornalled to and extending between said pair of mounting arms and having an engagement portion for selectively engaging with said pairs of engagement grooves to thereby maintain said movable frame portion in one of said raised, intermediate and lowered positions, said lock bracket means being pivotable between an engaged position wherein said engagement portion is engaged with one of said pairs of engagement grooves and a disengaged position wherein said engagement portion is disengaged from said pairs of engagement grooves; and

lock-off bracket means also journalled to and extending between said pair of mounting legs and including means defining a lock-off surface, wherein

said lock and lock-off bracket means together cooperate to retain said lock bracket means in said disengaged position in response to said lock bracket means contacting said upper engagement piece when said movable frame portion is raised beyond said raised position by virtue of interengagement between said lock bracket means and said lock-off surface thereby permitting free movement of said movable frame from said raised position to said lowered position, and to release said lock bracket means from said interengagement with said lock-off surface in response to said lock-off bracket means contacting said lower engagement piece when said movable frame portion reaches said lowered position, said lock bracket means responsively pivoting into said engaged position upon release of said

interengagement with said lock-off surface to thereby cause said engagement portion to engage that one pair of engagement grooves which establishes said lowered position, and wherein

said pair of engagement surfaces provide means for limiting pivotal movement of said lock means in one direction thereby establishing said engaged position of said lock bracket means by virtue of said lock bracket means coming into bearing contact with said pair of engagement surfaces upon reaching said engaged position and to thus also provide means to establish rigid interconnection between said U-shaped bracket and said support bracket when said engagement portion is engaged with one of said pairs of engagement grooves while yet permitting said lock bracket means to pivot in a second direction, opposite to said one direction, towards said disengaged position when said engagement portion is moved from said one to another of said pairs of engagement grooves upon said movable member being raised towards said raised position.

4,589,697

BEARING DEVICE FOR A CHAIR WITH INCLINE-ADJUSTABLE BACK-REST BEARER AND INCLINE-ADJUSTABLE SEAT

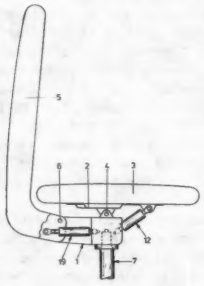
Hans-Peter Bauer, and Hans J. Bauer, both of Altdorf, Fed. Rep. of Germany, assignors to Fritz Bauer & Söhne oHG, Altdorf, Fed. Rep. of Germany

Filed Sep. 27, 1984, Ser. No. 655,094

Claims priority, application Fed. Rep. of Germany, Sep. 30, 1983, 3335463

Int. Cl.[4] A47C *3/00*

U.S. Cl. 297—300 **10 Claims**



1. In a bearing device for an incline-adjustable back-rest bearer and an incline-adjustable support plate for a seat of a height-adjustable chair, in particular an office chair, including a length-adjustable seat pneumatic spring on the bearing device connected by an articulated joint to the support plate, a length-adjustable back-rest pneumatic spring on the bearing device connected to the back-rest bearer by an articulated joint, a chair support column formed from a length-adjustable pneumatic spring which likewise is connected to the bearing device, the actuating rods of the seat pneumatic spring and of the back-rest pneumatic spring being directed towards each other and each one of the rods being in contact with one or two intermediate levers which are pivotably movable by means of an actuating lever movable in an approximately horizontal guide channel sot hat when the intermediate levers are in the position of their greatest displacement where the actuating rod concerned is pushed into the seat pneumatic spring or the back-rest pneumatic spring, they are arrestable and lockable into that position, and further including an actuating rod for the pneumatic chair support column located between the two intermediate levers which is actuated by the actuating lever, the improvement comprising:

a detent lever associated and resiliently acting in conjunction with each of the intermediate levers, said detent levers being located above the chair support column, a corresponding detent lever engaging behind its respective intermediate lever after that lever is pivoted outwardly away from the actuating lever, and wherein said guide channel has a central vertically extending channel section to allow for the actuation of the actuating rod of the chair support column.

4,589,698

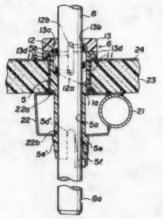
HEAD-REST DEVICE FOR A VEHICLE SEAT

Hiroshi Suzuki, Akishima, Japan, assignor to Tachikawa Spring Co., Ltd., Tokyo, Japan

Filed Mar. 29, 1984, Ser. No. 594,529

Int. Cl.[4] A47C *7/38*

U.S. Cl. 297—410 **5 Claims**



1. A head rest device for a vehicle seat comprising:

a head rest stay supported so as to be adjustable vertically:

a heat rest holder mounted to a seat back of said vehicle seat, said head rest holder having a through bore formed therein for receipt of said head rest stay therethrough; and

a lock mechanism provided in said seat rest holder, said lock mechanism including a cavity formed in an upper portion of said through bore of said holder, a cap rotatably provided on an upper mouth portion of said head rest holder, and torsion lock spring means disposed in said cavity such that one end of said spring means is secured to said head rest holder and the other end thereof is secured to said cap; wherein

said cavity is larger in diameter than said through bore of said head rest holder and has a bottom defining an inclined surface, said torsion lock spring means being disposed such that one side thereof is abutted at its lower end against an uppermost portion of said inclined surface of said cavity while the other side thereof at said lower end is separated from a lowermost portion of said inclined surface,

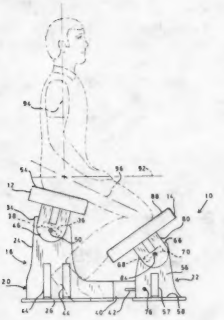
said torsion lock spring means for gripping said head rest stay to prevent vertical movement thereof, and when a sudden increased force is applied to a head rest body to thereby impart a corresponding increased downward sliding force to said head rest stay, said torsion lock spring means moves downwardly together with said head rest stay and is deformed along said inclined surface of said cavity thereby producing a stronger gripping force in said torsional lock spring means against said head rest stay, thus providing rigid gripping of said head rest stay by said spring means relative to said normal state to a degree that further downward sliding of said head rest stay through said spring means is substantially completely prevented.

4,589,699

SIT-KNEEL CHAIR

David L. Dungan, 1220 Bradford La., Knoxville, Tenn. 37919

Filed May 29, 1984, Ser. No. 614,744
Int. Cl.[4] A47C 7/50, 7/00
U.S. Cl. 297—423 5 Claims



1. A sit-kneel chair for supporting a person, said chair being adjustable to accommodate a specific stature of said person, which comprises:

a seat for supporting the posterior of said person, said seat having an under surface;

a knee support for supporting the forward portion of the knee or lower leg portion of said person, said knee support having an under surface;

a frame having

a. a first support asssembly for said for said seat, said first support assembly having a first base and an upstanding seat support member having an upper end,

b. a second support assembly for said knee support, said second support assembly having a second base and an upstanding knee support member, and

c. a connector means between said first and second bases, said connector means providing for adjustment of spacing between said first and second bases and thus between said seat and said knee support;

a first adjustment assembly for selecting tilt and height of said seat with respect to said upper end of said seat support member, and spacing of said seat from knee support, said first adjustment assembly comprising

a. a yoke member having parallel brackets attached to said under surface of said seat, said brackets provided with aligned apertures,

b. a clevis member at said upper end of said seat support member having parallel brackets to intermesh with said brackets of said yoke, said brackets of said clevis each provided with an inclined slot with a first end toward said knee support being closer to said first base than a second end, said slots provided with a plurality of selectivity spaced notches in a lower edge, and

c. a first fastener member passing through said slots of said clevis and said apertures in said yoke member, said fastener member provided with means for clamping said yoke member to said clevis member when said seat is properly positioned for tilt, height and spacing for said person; and

a second adjustment assembly for selecting tilt and height of said knee support with respect to said upper end of said knee support member, and spacing of said knee support from said seat, said second adjustment assembly comprising

a. a yoke member having parallel brackets attached to said under surface of said knee support, said brackets provided with aligned apertures,

b. a clevis member at said upper end of said knee support member having parallel brackets to intermesh with said brackets of said yoke, said brackets of said clevis each provided with an inclined slot with a first end toward said knee support being closer to said second base than a second end, said slots provided with a purality of selectively spaced notches in a lower edge, and

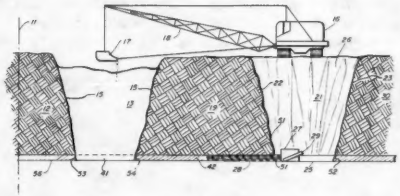
c. a second fastener member passing through said slots of said clevis and said apertures in said yoke member of said second adjustment assembly, said second fastener member provided with means for clamping said yoke member to said clevis member when said knee support is properly positioned for tilt, height and spacing for said person.

4,589,700

STRIP-AUGER METHOD OF MINING THIN SEAMS OF HYDROCARBONACEOUS DEPOSITS

Michael L. Schroder, Evergreen, Colo., assignor to Standard Oil Company (Indiana), Chicago, Ill.

Filed Feb. 21, 1984, Ser. No. 582,049
Int. Cl.[4] E21C 41/00, 47/02
U.S. Cl. 299—18 22 Claims



1. A method of area mining hydrocarbonaceous deposits comprising the steps of:

(a) forming a first working pit by stripping the overburden to expose the hydrocarbonaceous deposit;

(b) extracting the hydrocarbonaceous material between the highwalls of said first working pit;

(c) extracting additional hydrocarbonaceous material by auger mining into the exposed deposit seam of at least one highwall of said first working pit;

(d) repeating the operations of steps (a), (b) and (c) in a second and additional successive working pits until the property or geologic limits of said deposit are reached wherein said second and each of said successive working pits are parallel to but spaced apart from the preceding working pit leaving an undisturbed portion of overburden therebetween.

4,589,701

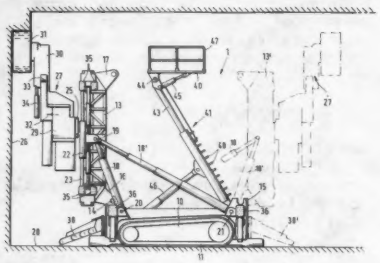
CUTTING MACHINE

Klaus Beckmann, Lünen, and Kunibert Becker, Werl, both of Fed. Rep. of Germany, assignors to Gewerkschaft Eisenhutte Westfalia, Lünen, Fed. Rep. of Germany

Filed Aug. 3, 1984, Ser. No. 637,256
Claims priority, application Fed. Rep. of Germany, Aug. 3, 1983, 3327941
Int. Cl.[4] E21C 27/00
U.S. Cl. 299—72 18 Claims

1. A cutting machine, comprising: a frame (10) having a longitudinal axis, a mast (13) pivotally mounted on the frame for movement between an upright working position and a down-swung non-working position, a carriage (22) slidably mounted on the mast, and a cutting head (27) mounted on the carriage, the cutting head being movable relative to the carriage in a direction which is lateral to the direction of movement of the carriage along the mast, wherein the frame is supported on a pair of endless drive tracks (11) which are parallel to the longitudinal axis of the frame, wherein the frame is provided with a pivot bearing (14, 15) adjacent to each end

thereof, each pivot bearing having a pivotal axis which extends transversely with respect to the longitudinal axis of the frame, and wherein the mast is provided with complementary pivot connections (16, 17) adjacent to the two ends thereof, each pivot connection being engageable with a respective pivot bearing to form a respective detachable pivot joint, the pivot



connections being spaced apart by the same distance as the pivot bearings, whereby the mast can be positioned in upright working positions at either end of the frame, in each of which working positions the mast is supported by the pivot joint at that end of the frame, and whereby the mast can be positioned in a substantially horizontal non-working position, in which the mast is supported by both pivot joints.

4,589,702

WHEEL, IN PARTICULAR FOR A TOY BUILDING SET

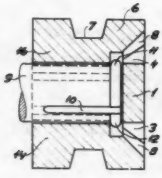
Erik Bach, and Erling T. Dideriksen, both of Billund, Denmark, assignors to Interlego A.G., Baar, Switzerland

Filed Jun. 8, 1984, Ser. No. 618,459

Claims priority, application Denmark, Jun. 9, 1983, 2633/83

Int. Cl.[4] B60B *5/02*

U.S. Cl. 301—63 PW **5 Claims**



1. A wheel, in particular for a toy building set, and with a hub comprising an outer cylindrical rim portion (6) and a plurality of axial ribs (14, 17) which extend radially inwardly from the hub ending in arcuate surfaces for supporting an axle and a hub cap (1–5) which is integrally connected to the wheel at an axial distance from the ribs (14–17) and which nowhere overlaps an axial elongation of the ribs within a region co-axial with the axis and of greater diameter than the support surface diameter.

4,589,703

HYDRAULIC BRAKE PRESSURE REGULATOR

Bernd-Guido Schulze, Wolfsburg, Fed. Rep. of Germany, assignor to Volkswagenwerk Aktiengesellschaft, Wolfsburg, Fed. Rep. of Germany

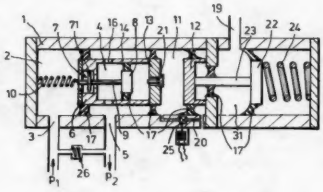
PCT No. PCT/EP83/00156, § 371 Date Feb. 15, 1984, § 102(e) Date Feb. 15, 1984, PCT Pub. No. WO84/00021, PCT Pub. Date Jan. 5, 1984

PCT Filed Jun. 15, 1983, Ser. No. 589,081

Claims priority, application Fed. Rep. of Germany, Jun. 16, 1982, 3222614

Int. Cl.[4] B60T *8/18, 8/26*

U.S. Cl. 303—6 R **13 Claims**



1. A hydraulic brake pressure regulator for the hydraulic brake system of a motor vehicle providing a family of characteristic curves which are dependent upon a vehicle parameter wherein each of the characteristic curves follows a nonlinear and continuous course comprising a housing having a first pressure chamber with a pressure inlet and a second pressure chamber with a pressure outlet, the first and second chambers being separated from one another by an axially displaceable first piston having a control valve which permits a pressure and flow connection for a hydraulic pressure medium between the first and second pressure chambers to be opened and closed, a second piston which is coaxial with respect to said first piston and axially displaceable independently of the first piston and which defines the second pressure chamber in the axial direction, the second piston being coupled by way of a rigid, force-transmitting member with the control valve so that opening and closing of the control valve is dependent upon the axial separation of the two pistons, a non-hydraulic first force mechanism having a linear characteristic, a non-hydraulic second force mechanism independent of the first force mechanism and having a variable, progressive characteristic dependent on a parameter of the vehicle, one of the force mechanisms acting on the first piston in a direction opposing the inlet pressure and the other force mechanism acting on the second piston in the same effective direction.

4,589,704

AIR BRAKE WITH COLLET LOCKED PUSH ROD AND AIR SUPPLY SYSTEM

John M. Graham, 820 N. Delaware St. #308, San Mateo, Calif. 94401

Filed Aug. 7, 1984, Ser. No. 638,441

Int. Cl.[4] B60T *13/22;* **F16D** *65/24*

U.S. Cl. 303—6 M **24 Claims**

1. A pressurized fluid actuated brake comprising:

a brake housing defining a service brake chamber and a collet brake chamber;

a push rod mounted to the housing for movement between brake on and brake off positions;

means, including a service brake diaphragm operably coupled to the push rod and responsive to the presence of a pressurized fluid within the service brake chamber, for driving the push rod towards the brake on position when the service brake chamber is at a first pressurized state; and

collet means, operably coupled to the push rod and responsive to the presence of a pressurized fluid within the collet

brake chamber, for selectively restricting movement of the push rod towards the brake off position, said push rod restricting means including:

a collet having a bore, a radially deflectable portion surrounding at least a portion of the bore, said radially deflectable portion including an external surface;

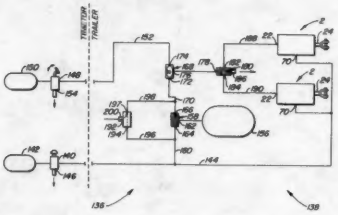
said housing defining a collet bore having an internal surface sized and positioned for mating engagement with said external surface, at least one of said internal and external surfaces being tapered;

a collet brake diaphragm partially defining the collet brake chamber;

means for mounting the collet to the collet brake diaphragm for movement of the collet in response to the presence of pressurized fluid within the collet brake chamber so to bias said collet away from said collet bore to disengage said external and internal surfaces when the collet brake chamber is at a second pressurized state;

said push rod including a movement limiting bar partialy housed within said bore and sized for complementary sliding engagement within the collet bore; and

spring means for driving the collet into the collet bore when said collet brake chamber is in a third pressurized state to lock the movement limiting bar in place thereby restricting movement of the push rod towards the brake off condition.



4,589,705

RELEASE DEVICE FOR MULTIPLE RELEASE COMPRESSED AIR BRAKES OF RAILBORNE VEHICLES

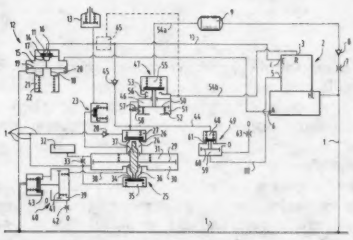
Johann Huber, Munich, Fed. Rep. of Germany, assignor to Knorr-Bremse AG, Munich, Fed. Rep. of Germany

Filed Oct. 18, 1984, Ser. No. 662,095

Claims priority, application Fed. Rep. of Germany, Oct. 25, 1983, 3338699

Int. Cl.⁴ B60T *15/18*

U.S. Cl. 303—36 **11 Claims**



1. In a release device for multiple release compressed air brakes of rail vehicles, a main air pipe **(1)**, an air reservoir **(9)** and a reference pressure chamber **(31)** connected to said main air pipe, a triple pressure control valve **(2)** having a control chamber and brake and release positions connected to said main air pipe and said air reservoir, a brake cylinder **(13)** connected to said triple pressure control valve such that the triple pressure control valve is controlled by the pressure in the main air pipe in opposition to the pressure in the reference pressure chamber to monitor the supply of brake pressure air to said brake cylinder from said air reservoir, a first release nozzle **(63)** having a selectively variable cross section and connected to said brake cylinder and said triple pressure control valve to vent said brake cylinder to the atmosphere in response to said triple pressure control valve, valve means **(23, 26)** connected to said brake cylinder and to said main air pipe for supplying compressed air into the main air pipe during brake release following rapid or full brake application, and a first stop valve **(53)** connected to said valve means to be actuated thereby and connected between said air reservoir and said triple pressure control valve to block said air reservoir from the brake pressure in said brake cylinder during said brake release until said triple pressure control valve is changed from its brake position into the release position.

4,589,706

VEHICLE BRAKE SYSTEM FOR CONTROLLING WHEEL BRAKE SLIPPAGE AND WHEEL DRIVE SLIPPAGE

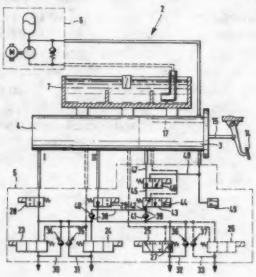
Heinz Leiber, Oberriexingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Nov. 19, 1984, Ser. No. 672,972

Claims priority, application Fed. Rep. of Germany, Jan. 19, 1984, 3401690

Int. Cl.⁴ B60T *8/02, 13/14*

U.S. Cl. 303—114 **20 Claims**



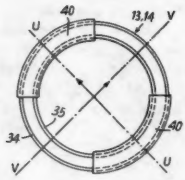
1. A vehicle brake system for controlling wheel brake slippage and wheel drive slippage having wheel brakes for driven wheels; a brake force booster, which has a booster chamber; a main cylinder, which has at least one brake piston associated with at least one service brake circuit and acted upon by the booster chamber; a pressure source communicating with a control valve actuated by a brake pedal for directing a booster pressure into the booster chamber derived from said pressure source communicating with the control valve; brake pressure control valves associated with the wheel brakes for reducing wheel slippage; and means for temporarily connecting the booster chamber with said brake pressure control valves, a switchover valve connected between the booster chamber and the brake pressure control valves for connecting these pressure control valves with the booster chamber in the event that impermissible brake slippage arises and for connecting said pressure control valves directly with the pressure source in the event that impermissible drive slippage arises at said driven wheels and a blocking valve disposed in each said at least one service brake circuit for blocking off the main cylinder during actuation of the brake pressure control valves.

4,589,707

KINETIC WHEEL ARRANGEMENT INCORPORATING MAGNETIC BEARINGS, PARTICULARLY INTENDED TO SERVE AS ENERGY ACCUMULATOR

Paul D. Caye, Epone; Patrice C. Jamain, Maule, and Bernard G. Weisser, Limay, all of France, assignors to Societe Nationale Industrielle Aerospatiale, Paris, France

Continuation of Ser. No. 515,149, Jul. 19, 1983, abandoned. This application Jan. 29, 1985, Ser. No. 695,756
Claims priority, application France, Aug. 19, 1982, 82 14340
Int. Cl.[4] F16C *39/06*
U.S. Cl. 308—10 10 Claims



1. A kinetic wheel arrangement, comprising:
a stator,
a rotor,
magnetic bearings formed by cooperating annular parts respectively connected to the stator and to the rotor to magnetically suspend the rotor with respect to the stator,
mechanical bearings to enable the stator to support the rotor when the latter is not suspended magnetically,
an inertia flywheel constituting a part of the rotor, and
a magnetic system having at least one electrically conductive disc connected to the stator and disposed between two magnetized rings connected to the rotor, said electrically conductive disc having in two opposite quadrants magnetic inlays, said magnetic inlays are connected to one another by wide magnetic zones disposed in the other two opposite quadrants, whereby said magnetic system imparts a radial rigidity of the rotor with respect to the stator in first one predetermined radial direction a value different from that presented by said radial rigidity in other radial directions such that a radial dissymmetry of rigidity is introduced and vibrations capable of appearing along said first predetermined radial direction and another radial direction are uncoupled.

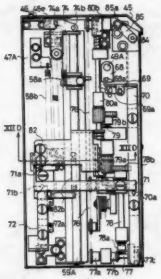
4,589,708

DEVICE FOR CARRYING BANK NOTES STACKED IN CONTAINER BOX ADAPTED FOR USE IN AUTOMATIC MONEY DEPOSITING AND DISBURSING MACHINE

Eiichi Kokubo; Koichi Goi; Junichi Arikawa; Hideyuki Ebihara, and Hiroshi Chiba, all of Tokyo, Japan, assignors to Laurel Bank Machine Co., Ltd., Tokyo, Japan

Filed Feb. 1, 1983, Ser. No. 462,986
Claims priority, application Japan, Feb. 4, 1982, 57-16597
Int. Cl.[4] B65G *1/16*
U.S. Cl. 312—71 8 Claims

1. A device for carrying bank notes stacked in a container box and adapted to be inserted in an automatic money depositing and disbursing machine, which comprises:
at least one box removably attached within the machine and having an upper opening, the box being adapted to receive the bank notes therein from the machine and to dispense the bank notes therefrom into the machine, through the upper opening, when the box is disposed within the machine,
a pressing plate disposed within the box for movement toward and away from said upper opening in the box for carrying the bank notes that are stacked in the box,
a link shaft having an axis, said link shaft axially and rotatably movably supported and disposed within the box and movable along its own axis and rotatable about its own axis, said link shaft operatively connected to the pressing plate so that the rotation of the link shaft causes the pressing plate to move toward and away from said upper opening, and



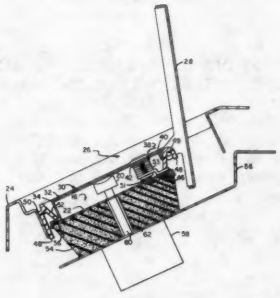
means for locking the link shaft to prevent the link shaft from being rotated and thereby preventing the pressing plate from being moved toward and away from said upper opening.

4,589,709

LOCKING COVER FOR AIR CONDITIONER

Ralph W. Bond, Cedar Rapids, and Harold W. Pitz, Amana, both of Iowa, assignors to Amana Refrigeration, Inc., Amana, Iowa

Filed Oct. 17, 1984, Ser. No. 661,637
Int. Cl.[4] A47B *43/00*
U.S. Cl. 312—257 A 10 Claims



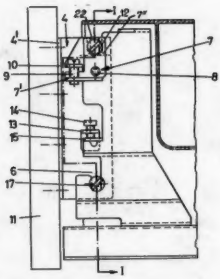
1. A removable locking cover for an air conditioner control panel positioned behind an access opening in the enclosure of the air conditioner and engaged between the peripheral region of the enclosure around the opening and a resilient pad, comprising:
a cover plate;
means for spacing said plate from said panel;
means connected to said spacing means removably insertable between said panel and said peripheral region on one side of said opening for securing said cover plate on said one side; and
a lock connected to said cover plate, said lock having a rotatable arm adapted for inserting between said panel and said peripheral region on the opposite side of said opening for securing said cover plate on said opposite side.

4,589,710

FASTENING DEVICE

Erich Röck, and Josef Brunner, both of Höchst, Austria, assignors to Julius Blum Gesellschaft m.b.H., Höchst, Austria

Filed Apr. 19, 1984, Ser. No. 601,846
Claims priority, application Austria, Jun. 10, 1983, 2124/83
Int. Cl.[4] A47B *88/00*
U.S. Cl. 312—330 R **9 Claims**



1. In an arrangement for adjustably mounting a front plate on an extractable furniture part, particularly a drawer, said arrangement being of the type including, at each side of the furniture part, a fastening device comprising a supporting member to be mounted on the furniture part, a holding member to be mounted on the front plate, and upper screw means for connecting said holding member to said supporting member and thereby for mounting the front plate on the furniture part, and further including means for adjusting the vertical position of the front plate relative to the furniture part, and means for readjusting the lateral position of the front plate relative to the furniture part, the improvement wherein said lateral adjusting means comprises:

an adjusting screw at a lower portion of only a first said fastening device at one side of the furniture part, said adjusting screw having an axis extending parallel to the plane of the front plate, and said adjusting screw being axially fixed to one of said members of said first fastening device and threaded into the other said member of said first fastening device, whereby rotation of said adjusting screw laterally moves said one member relative to said other member and thus laterally adjusts to position of the front plate relative to the furniture part; and

means, at a lower portion of the second said fastening device at the other side of the furniture part, for freely guiding relative lateral movement between said members of said second fastening device.

4,589,711

DRAWER APPARATUS

Robert R. Plank, 8426 Vine Valley Dr., Sun Valley, Calif. 91352

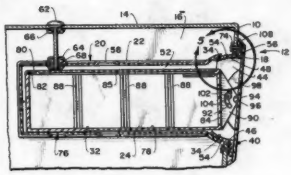
Filed Dec. 24, 1984, Ser. No. 686,093
Int. Cl.[4] A47B *88/00*
U.S. Cl. 312—330 R **13 Claims**

1. A drawer apparatus comprising:

a drawer housing adapted to be fixedly mounted within an enclosed space defined in part by an exterior planar wall, said drawer housing having an open front wall providing access into an interior compartment;

a drawer housing face connected to said drawer housing by first connecting means, said drawer housing face to butt against said exterior planar wall, said first connecting means permitting pivoting of said drawer housing face about a first pivot axis relative to said drawer housing, said drawer housing face to be initially pivoted about said first pivot axis until said drawer housing face assumes a desired position butting against said exterior planar wall, said drawer housing face being then fixed in said desired position by first fixing means;

a drawer located within said interior compartment, said drawer slideably movable relative to said drawer housing between a retracted position and an extended position, said retracted position defined when said drawer is substantially totally confined within said interior compartment, said extended position defined when said drawer is substantially located exteriorly of said interior compartment, said drawer having an article containing compartment; and



a drawer face mounted by second connecting means to said drawer, said second connecting means permitting pivoting of said drawer face about a second pivot axis relative to said drawer, said drawer face being pivotally adjusted to a particular position and then permanently fixed in said particular position by second fixing means, with said drawer in said retracted position said drawer face to be in juxtaposition with said drawer housing face and to also abut against said exterior planar wall.

4,589,712

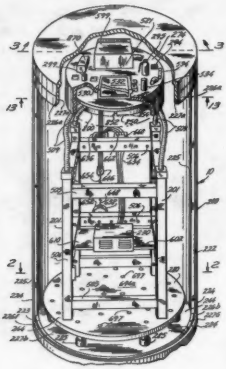
DATA PROCESSING EQUIPMENT ENCLOSURES

Otis H. Hastings, 130 E. Crescent Ave., Mahwah, N.J. 07430

Continuation of Ser. No. 282,708, Jul. 13, 1981, and a continuation-in-part of Ser. No. 952,782, Oct. 19, 1978, Pat. No. 4,348,966, said Ser. No. 282,708, is a continuation-in-part of Ser. No. 119,816, Feb. 8, 1980, abandoned, which is a continuation of Ser. No. 1,264, Jan. 5, 1979, abandoned, said Ser. No. 952,782, is a division of Ser. No. 827,593, Aug. 25, 1977, Pat. No. 4,121,523, which is a continuation-in-part of Ser. No. 602,404, Aug. 7, 1975, abandoned, and a continuation-in-part of Ser. No. 825,174, Aug. 16, 1977, abandoned, which is a continuation of Ser. No. 602,404,. This application May 17, 1984, Ser. No. 611,401
The portion of the term of this patent subsequent to May 22, 2001, has been disclaimed.
Int. Cl.[4] A47B *77/08;* F25D *23/12*
U.S. Cl. 312—236 **27 Claims**

1. A transaction processing enclosure for housing of electronic data processing equipment, components thereof and the like comprising, in combination, an enclosure and a frame disposed therein comprising hollow conduit support members arrayed at spaced intervals to provide a unitary support struc-

ture adapted to receive and store said data processing equipment and components; a plurality of said hollow support members being interconnected in a manner such as to distribute a fluid therethrough.



4,589,713

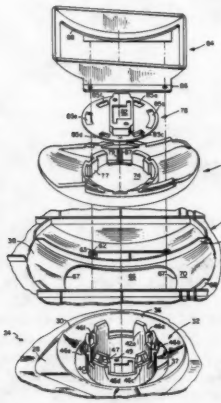
VIDEO DISPLAY SUPPORT JOINT

Paul H. Pfuhl, Wrentham, Mass.; Charles E. Morrison, Newbury Park, and Victor D. Decker, Simi Valley, both of Calif., assignors to Raytheon Company, Lexington, Mass.

Filed Apr. 9, 1984, Ser. No. 597,903

Int. Cl.[4] H01R *35/04*

U.S. Cl. 339—7 **19 Claims**



1. A video terminal, comprising:

an electronics unit having a top cover with a recess defining a spherically congruent seat;

a CRT unit having an enclosure with a spherical segment protruding downwardly for resting on said seat to provide support for said CRT unit; and

means for engaging said CRT unit to said electronics unit to prevent separation, said engaging means providing limited horizontal rotation of said spherical segment on said seat for swiveling said CRT unit, said engaging means providing limited vertical rotation of said spherical segment on said seat for tilting said CRT unit, said engaging means permitting separation of said CRT unit from said electronics unit by lifting said CRT unit upward in one unique horizontal rotational relationship of said CRT unit to said electronics unit.

4,589,714

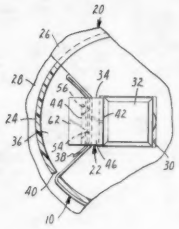
GROUND CLIP FOR PHOTOCONDUCTIVE FILM

Thomas A. Turgeon, Fridley, Minn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Feb. 6, 1984, Ser. No. 577,200

Int. Cl.[4] H01R *4/66*

U.S. Cl. 339—14 R **8 Claims**



1. In combination with a film reel having a web partially defining a central bore adapted to accept a shaft and a laminated film wound on said reel to lie against said web opposite said shaft, said film including a conductive layer and an overlying insulating layer opposite said web, a U-shaped, flat metal ground clip adapted to span said web and form an electrical connection between said film conductive layer and said shaft comprising:

a flat, metal crosspiece spanning said web and including ends parallel to said web and adjacent said shaft and said film, said crosspiece having a length greater than the combined thicknesses of said web and said film;

a flat, metal first leg extending from said crosspiece end adjacent said shaft perpendicular to said crosspiece and between said web and said shaft;

a flat, metal second leg having a length less than or equal to the length of said first leg and extending from said end of said crosspiece adjacent said film at an acute angle toward said first leg so that the separation of said legs is a maximum at said crosspiece and a line of minimum spacing less than the combined thicknesses of said web and said film is produced between said legs at a position along said legs removed from said crosspiece whereby said film is forced against said web at said line of minimum spacing; and

at least one barb projecting from said second leg toward said first leg and said crosspiece, said barb terminating in a sharp edge spaced from said first leg a distance less than said minimum spacing to penetrate said insulating layer.

4,589,715

ELECTRICAL CONNECTOR KIT

Lawrence P. Weisenburger, Kernersville, N.C., assignor to AMP Incorporated, Harrisburg, Pa.

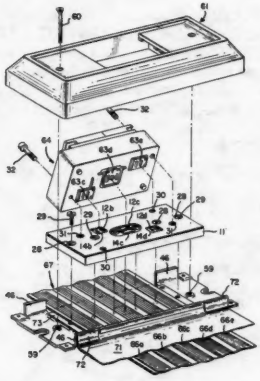
Continuation of Ser. No. 501,598, Jun. 6, 1983, abandoned. This application Jan. 7, 1985, Ser. No. 689,496

Int. Cl.[4] H01R *9/09*

U.S. Cl. 339—17 F **18 Claims**

1. An adapter kit for use in connecting individual conductors of an upper array of coplanar flat conductors, consisting of contact elements, in a separate connector, to preselected alternative individual conductors of a lower, parallel array of coplanar flat conductors, consisting of a flat cable having a plurality of side by side flat conductors surrounded by electrical insulation, at least some of the individual conductors of the lower array being laterally spaced from individual conductors of the first array, the kit comprising a plate-like insulating body

formed with contact locating means for locating a predetermined plurality of separate upper and lower contact parts respectively on upper and lower opposite faces, for alignment of upper contact parts with respective conductors of the upper array and for alignment of lower contact parts with respective conductors of the lower array, the predetermined contact locating means including through-sockets extending between the faces, upper and lower contact parts located in respective locating means; upper and lower contact parts in mutual alignment only being joined together by body portions receivable in the through-sockets and extending therebetween, bus channels extending laterally across the body between locating means on one surface of the insulating body; bus portions adapted for location in preselected alternative channels electrically to connect corresponding laterally spaced upper and lower contact parts whereby on interposing the adapter kit between the upper and lower array of conductors, preselected alternative individual conductors of the lower array can be connected to laterally-spaced conductors of the upper array.



4,589,716

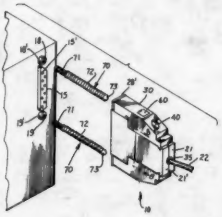
RELEASABLE SNAP CONNECTOR

Joseph R. Williams, II, 5296 Amhurst, Norcross, Ga. 30092

Filed Sep. 16, 1983, Ser. No. 532,679

Int. Cl.[4] H01R *13/627*

U.S. Cl. 339—91 R **1 Claim**



1. A releasable connector comprising:

an elongate member including a threaded end section for attachment to a conventional computer interface socket and a ribbed end section dimensioned to freely extend through a conventional interface plug mounting; and

an adapter member, said adapter member comprising means for attaching said adapter member to a conventional interface plug, an internal passageway positioned to communicate with a conventional interface plug mounting and dimensioned to freely receive said ribbed end section of said elongate member, a pair of inwardly-biased plates mounted for radial movement with respect to said internal passageway each of said plates further including a bumper integrally formed therewith, and tab means positioned to engage said bumpers for selectively separating said inwardly biased plates, whereby said elongate member extends through said interface plug mounting sand engages said adapter member so as to releasably retain a conventional computer interface socket.

4,589,717

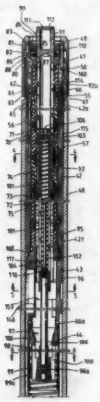
REPEATEDLY OPERABLE ELECTRICAL WET CONNECTOR

Alain P. Pottier; James J. Walulik, both of Houston, and Ralph L. Simmons, Pearland, all of Tex., assignors to Schlumberger Technology Corporation, Houston, Tex.

Filed Dec. 27, 1983, Ser. No. 565,794

Int. Cl.[4] H01R *4/00*

U.S. Cl. 339—94 M **2 Claims**



1. Electrical connector assembly for effecting the connection of groups of electrical contacts in a fluid medium, comprising:

a male connector with a cylindrical pin; and

a female connector with a bore to accommodate said pin, said female connector comprising a sealing member slidable in the bore, a retaining means defining an end position, in which the sealing member closes the bore, said bore being, when the male connector is not inserted, filled with a dielectric liquid, and means for urging the sealing member to said sealing position;

said pin of the male connector having an end arranged for engagement with the sealing member, said end and said sealing member comprising means for producing a positive coupling between the pin and the sealing member as a result of their engagement;

wherein the sealing member has a cavity and a snap ring lodged in said cavity, and the end portion of the pin has a groove in which said snap ring can engage to create the coupling; and

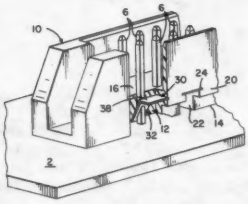
wherein the end portion of the pin includes a part having the same diameter as the pin and a nose extending from said part, with a radial surface joining said part and said nose, and said groove is formed on the nose rear said radial surface; wherein the nose has a radial hole outletting into said groove and an axial hole connecting with said radial hole and outletting at the end of the nose.

4,589,718

PIN SHROUD WITH LOCKING CLIP

David S. Szczesny, Harrisburg, Pa., assignor to AMP Incorporated, Harrisburg, Pa.

Filed Jul. 24, 1985, Ser. No. 758,012
Int. Cl.[4] H01R 4/02
U.S. Cl. 339—95 D 4 Claims



1. A shroud for reception on a pin array extending from a printed circuit board or the like, said shroud comprising:

a dielectric base having a bottom surface for disposition against said printed circuit board, an opposed inside surface, and a plurality of pin receiving passages between said surfaces,

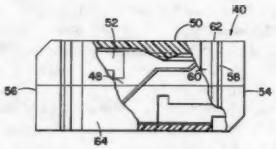
retaining means comprising at least one metal locking clip fixed in said base, said locking clip having a substantially planar spring aligned with a respective passage, said spring having an aperture therethrough which is normally nonaligned with said passage, said spring being disposed substantially obliquely to the axis of a pin and being biased to accommodate said pin through said aperture when said shroud is received on said pin array, said aperture having an edge portion toward said bottom surface which bites into said pin to retain said shroud against said printed circuit board.

4,589,719

WALL PLATE ASSEMBLY FOR IN-LINE ELECTRICAL COUPLING

John M. Gentry, Candler, and Lee A. Archer, Asheville, both of N.C., assignors to Brand-Rex Company, Willimantic, Conn.

Filed Sep. 10, 1984, Ser. No. 649,137
Int. Cl.[4] H01R 13/426
U.S. Cl. 339—126 R 10 Claims



1. An electrical coupling assembly comprising:

a wall-mountable plate having at least one hole therethrough; a coupling including a housing having a bore therethrough; said coupling received in and extending through said hole; a plurality of electrical contacts received in said bore;

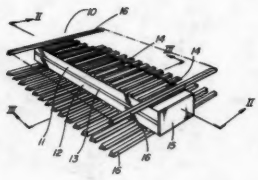
said coupling having a pair of open ends; said ends adapted to receive and secure thereto a first and a second modular plug wherein electrical signals may be transmitted from the first plug to the second plug; and means for securing said coupling to said plate including first and second sets of grooves in said housing, the grooves of each of said sets opening outwardly through opposite sides of said housing, the grooves of said second set being substantially wider than the grooves of said first set, and a pair of generally C-shaped clips, each of said clips having a pair of spaced apart legs connected together by a central portion, said clips straddling said housing at opposite sides of said plate, one of said clips having portions of the legs thereof received within the grooves of said first set, the other of said clips being a spring clip having bowed legs received within the grooves of said second set and acting between said plate and said housing to bias said housing rearwardly relative to said plate.

4,589,720

PLANAR ELECTRONIC FILTER ELEMENT AND A CONNECTOR EMBODYING SUCH A FILTER

Sharanjit S. Aujla; Richard J. Middlehurst, both of Kanata, and John P. Simpson, Nepean, all of Canada, assignors to Northern Telecom Limited, Montreal, Canada

Filed Jul. 20, 1983, Ser. No. 515,561
Int. Cl.[4] H03H 7/00
U.S. Cl. 339—147 R 14 Claims



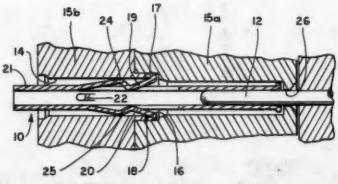
1. An electronic filter comprising at least two planar dielectric plates in a sandwich formation with a planar ground plate extending between the dielectric plates; a plurality of parallel spaced electrodes on each outer surface of the dielectric plates, the electrodes on each outer surface extending in a plane parallel to the plane of the ground plate; a plurality of spaced parallel terminal pins attached to said electrodes, a terminal pin on each electrode, the terminal pins extending in two spaced planes parallel to the plane of the ground plate; and contact means on at least one end connected to said ground plate.

4,589,721

ELECTRICAL CONNECTOR HAVING PIN CONTACT RECEPTACLE WITH RELEASABLE RETAINING MEANS

Albert R. Sedig, and Fred A. Boccelli, both of Maricopa, Ariz., assignors to ITT Corporation, New York, N.Y.

Filed Jun. 25, 1984, Ser. No. 624,493
Int. Cl.[4] H01R 4/24
U.S. Cl. 339—210 R 12 Claims



1. An electrical connector comprising a molded insulator having at least one cavity for a pin contact receptacle, said cavity having at least a forward facing annular shoulder, a section aft of said shoulder of a diameter greater than the outside diameter of said receptacle, and a smaller diameter section for pin contact fingers of said receptacle forward of said shoulder, a tubular pin contact receptacle inserted into

said cavity with its pin receiving end first in the same direction that said shoulder faces, said receptacle having a longitudinal axis and diametrically opposing integral retention fingers cut out of the receptacle wall and extending in the direction of its pin receiving end at a small angle away from said axis, each of said retention fingers having its end bent outwardly and back to a position approximately parallel with said receptacle axis, thereby to form hooks the rearwardly facing ends of which engage said annular shoulder in said insulator cavity, each of said fingers being formed with an outwardly protruding bend so that an extraction tool may be inserted through the larger diameter portion of the cavity from the rear over the bends in the fingers to force the fingers into the tubular receptacle, and thus move the hooked ends thereof out of the way of the forward facing annular shoulder.

4,589,722

FLIP-TOP ELECTRICAL CONNECTOR

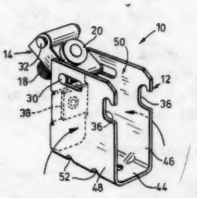
Holland Hall, Mississauga, and Richard Nielson, Burlington, both of Canada, assignors to Ilsco of Canada Limited, Ontario, Canada

Filed May 2, 1984, Ser. No. 606,400

Claims priority, application Canada, Jan. 19, 1984, 445669

Int. Cl.[4] H01R *4/40*

U.S. Cl. 339—272 UC **10 Claims**



1. A connector for electrical conductors comprising:

(a) a body member having a bottom wall formation presenting two opposed peripheral upstanding side wall formations for receiving said electrical conductors therewithin and having an opening at the top thereof, both side wall formations including aligned retaining slots opening along an edge thereof,

(b) a closure member pivotally slideably connected to said body member about a moveable axis so as to swing from a closed position where said closure member closes said opening to an open position where said closure member provides access to said opening,

(c) said closure member including projections operably releasably engagable with said retaining slots to engage said retaining slots in said closed position by pivotally sliding said closure member relative said body member and about said moveable axis to said closed position and releasable from said retaining slots by pivotally sliding said closure member relative said body member and about said moveable axis to said open position where said closure member provides access to said opening,

(d) said closure member including clamp means for clamping said electrical conductors between said members in said closed position and securing said projections to said retaining slots against dislodgement so as to secure said members against relative displacement in said closed position.

4,589,723

HOLOGRAPHIC ENDOSCOPE

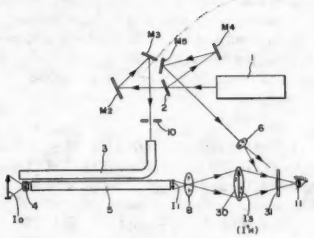
Yoshikazu Doi; Masane Suzuki, and Yasumasa Sunaga, all of Saitama, Japan, assignors to Fuji Photo Optical Co., Ltd., Saitama, Japan

Filed Apr. 24, 1984, Ser. No. 603,960

Claims priority, application Japan, Apr. 30, 1983, 58-77239

Int. Cl.[4] G02B *23/26*; G03H *1/04*; A61B *1/06*

U.S. Cl. 350—3.83 **4 Claims**



1. In a holographic endoscope having a laser light source emitting a beam of light, means placed in the path of said beam for splitting said beam into an illuminating beam and a reference beam, a first optical system through which said illuminating beam passes for illuminating an object to be viewed and receiving and transmitting the image of that object toward a photographic medium, a second optical system for directing said reference beam toward said photographic medium, and means disposed in the path of said reference beam for interfering said reference beam and said transmitted image to produce an interference pattern to be recorded on said photographic medium; the improvement comprising a field lens disposed between said first optical system and said photographic medium in the path of said illuminating beam for increasing the intensity of the said transmitted image toward said photographic medium while allowing the distance between said first optical system and said photographic medium to be increased so as to accommodate the reference beam with which said transmitted image is made to interfere.

4,589,724

MULTIPLE BRANCHING LIGHT WAVE GUIDE ELEMENT

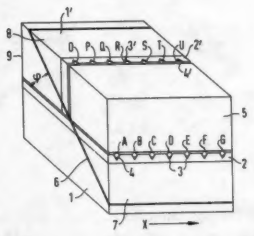
Gerhard Winzer, Munich, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Feb. 3, 1981, Ser. No. 231,011

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1980, 3008106

Int. Cl.[4] G02B *6/26, 6/42*

U.S. Cl. 350—96.15 **7 Claims**



1. A multiple branching element for distributing light from at least one feeding light wave guide to continuing light wave guides according to the beam splitting principle in which a

plurality of first and second aligned guidance channels are disposed parallel to one another in one plane in a body, said guidance channels being separated by means of a single reflective layer inclined with respect thereto and a plurality of further third guidance channels with one for each of said first and second guidance channels extending from the mirror layer and one of said aligned first and second guidance channels, a plurality of light wave guides mounted in said first, second and third plurality of channels characterized in that said reflective layer is formed as an edge variable filter (6), whereby the wavelength λ_K of the filter varies continuously as a function of the distance (x) from the end of the filter perpendicular to the first, second and third plurality of guidance channels.

4,589,725

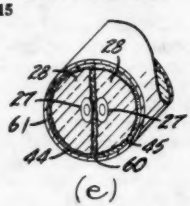
OPTICAL-FIBER DIRECTIONAL COUPLER USING BORON OXIDE AS INTERSTITIAL MATERIAL

Richard B. Dyott, Orland Park, Ill., assignor to Andrew Corporation, Orland Park, Ill.

Filed Mar. 28, 1984, Ser. No. 594,478

Int. Cl.[4] G02B *6/26*

U.S. Cl. 350—96.15 **19 Claims**



(e)

9. An evanescent-field coupler for a pair of optical fibers each having a core and a cladding forming a guiding region located sufficiently close to the surface of the fiber along a selected length thereof to allow evanescent-field coupling of an optical signal from said guiding region to the other optical fiber, the claddings of both fibers consisting essentially of silica, said coupler comprising a vitreous layer of amorphous boron oxide or a boron-oxide compound fused to the claddings of both fibers and having an index of refraction substantially matching the index of said claddings.

4,589,726

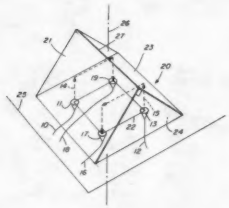
OPTICAL FIBER ROTARY SWITCH

Carl F. Buhrer, Framingham, Mass., assignor to GTE Laboratories Incorporated, Waltham, Mass.

Filed May 7, 1984, Ser. No. 607,533

Int. Cl.[4] G02B *6/36*

U.S. Cl. 350—96.20 **7 Claims**



1. Apparatus for switching light beams from a first optical fiber and a second optical fiber, alternately, onto a third optical fiber and a fourth optical fiber, respectively, and onto said fourth optical fiber and said third optical fiber, respectively, comprising

first means coupled to said first optical fiber for causing light emerging therefrom to be focused into a first expanded parallel beam along a first central axis;

second means coupled to said second optical fiber for causing light emerging therefrom to be focused into a second expanded parallel beam along a second central axis;

third means coupled to said third optical fiber for causing a third expanded parallel beam of light, along a third central axis, to be focused onto said third optical

fourth means coupled to said fourth optical fiber for causing a fourth expanded parallel beam of light, along a fourth central axis, to be focused onto said fourth optical fiber,

said first means, said second means, said third means, and said fourth means being so oriented that said first beam, said second beam, said third beam, and said fourth beam are oriented parallel to each other, that said axes are parallel to each other, and that a plane oriented perpendicular to said axes intersects said axes at a first point, a second point, a third point, and a fourth point, respectively, and that said points form corners of a square with said first point and said second point forming opposite diagonal corners of said square, and said third point and said fourth point forming the other opposite diagonal corners of said square;

a right isosceles triangular optical prism having a pair of lateral plane face surfaces of equal size which join together at right angles along a common apical edge, said surfaces being coupled together with a hypotenuse face which is parallel to said edge, said hypotenuse face having an area in excess of the area of said square;

means for orienting said prism so that said hypotenuse face is parallel to said plane, so that a rotational axis drawn through said apical edge and the center of said square is perpendicular to said plane, and so that a line drawn from said first point to said third point is parallel to said apical edge; and

means for rotating said prism 90° about said rotational axis so said hypotenuse face is parallel to said plane, so that said rotational axis drawn through said apical edge and said center of said square is perpendicular to said plane, and so that a line drawn from said first point to said fourth point is parallel to said apical edge.

4,589,727

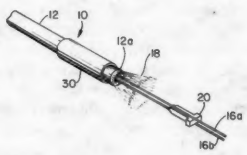
OPTICAL FIBER RETAINER

Russell H. Williams, Flemington, N.J., assignor to Thomas & Betts Corporation, Raritan, N.J.

Filed Aug. 29, 1983, Ser. No. 527,440

Int. Cl.[4] G02B *6/36*

U.S. Cl. 350—96.20 **10 Claims**



1. A device for separating and supporting a plurality of optical fibers extending from a tubular optical cable comprising:

an elongate member havining an insertion end for inserting into said tubular cable and having a plurality of fiber accommodating surfaces along the longitudinal extent thereof, said elongate member being dimensioned for placing said fibers in frictional engagement between said fiber accommodating surfaces and the inner wall of said tubular cable; and

a stop member at the end of said elongate member opposite

said insertion end for preventing over insertion of said elongate member into said cable.

4,589,728

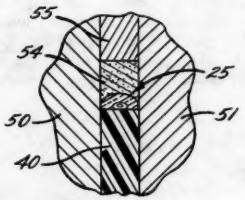
OPTICAL FIBER POLARIZER

Richard B. Dyott, Orland Park, Ill.; Reinhard Ulrich, Buchholz, Fed. Rep. of Germany, and John D. Meyer, Western Springs, Ill., assignors to Andrew Corporation, Orland Park, Ill.

Filed Aug. 26, 1983, Ser. No. 526,553

Int. Cl.[4] G02B *6/14*

U.S. Cl. 350—96.30 **18 Claims**



1. A fiber-optic polarizer comprising the combination of

an optical fiber having a core and cladding with different refractive indices and forming a single-mode guiding region,

said core having a non-circular cross-section defining two transverse orthogonal axes which, in combination with said different refractive indices, de-couple waves polarized along said axes,

said guiding region being offset from the center of gravity of the fiber and located sufficiently close to the surface of one side of the fiber, along a selected length of the fiber, to expose the evanescent field of the guiding region at the surface of said one side to allow coupling to a contiguous medium,

the outer surface of the fiber having a non-circular cross-section with a predetermined geometric relationship to said guiding region and said orthogonal transverse axes so that the location of said guiding region and the orientation of said axes can be ascertained from the geometry of said outer surface and

a polymeric film extending longitudinally along a selected length of said fiber on said one side thereof and coupled to the evanescent field exposed at the fiber surface on said one side, said film having different indices of refraction along axes aligned with the transverse orthogonal axes of said core, the index of refraction that is aligned with the axis of polarization of a desired wave in said fiber being less than the effective index of refraction of said desired wave in said guiding region of said fiber, and the other index of refraction of said film being greater than the effective index of refraction of an unwanted wave in said guiding region of said fiber, said unwanted wave having an axis of polarization orthogonal to the axis of polarization of said desired wave.

4,589,729

APPARATUS COMPRISING AN ARTICULATED ARM RADIATION GUIDE

Thomas J. Bridges, Holmdel, and Albert R. Strnad, Colts Neck, both of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Continuation of Ser. No. 338,871, Jan. 12, 1982, abandoned. This application Sep. 19, 1984, Ser. No. 652,412

Int. Cl.[4] G02B *6/20*

U.S. Cl. 350—96.32 **9 Claims**

1. Apparatus comprising an articulated arm for guiding infrared radiation, the infrared radiation having a wavelength and a propagation direction, the articulated arm comprising

(a) a multiplicity of substantially straight tube members including a first tube member and a second tube member, each tube member having an axis, an input end and an output end;

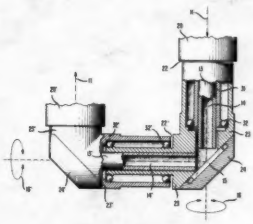
(b) connecting means for movably connecting the output end of the first tube member to the input end of the second tube member, the first tube member being connected by the connecting means to the second tube member,

(c) radiation propagation direction altering means,

(d) means for attaching the articulated arm to infrared radiation generating means, and

(e) means for attaching radiation output means to the articulated arm, Characterized in That the articulated arm further comprises

(f) a multiplicity of tubular dielectric infrared radiation guiding means of the Marcatili-Schmeltzer type including first guiding means and second guiding means, the first and second guiding means each substantially consisting of dielectric material that is substantially transparent to at least some radiation in the visible part of the electromagnetic spectrum, and each having substantially circular cross section, with bore diameter between about 50 times and about 200 times the wavelength of the infrared radiation, the first guiding means being maintained substantially within the first tube member, and the second guiding means being maintained substantially within the second tube member, and



(g) the propagation direction altering means comprise reflecting means adapted for directing at least a substantial part of infrared radiation incident thereon from the first guiding means into the bore of the second guiding means.

4,589,730

LIGHT TRANSMISSION CONTROL APPARATUS USING AIR BUBBLES

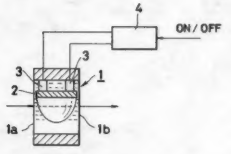
Makoto Obu, Tokyo, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Jul. 27, 1983, Ser. No. 517,651

Claims priority, application Japan, Jul. 28, 1982, 57-130411; Sep. 3, 1982, 57-152530

Int. Cl.[4] G02B *5/24*; G05D *25/04*

U.S. Cl. 350—267 **20 Claims**



1. An optical switching device comprising:

a container for containing therein a quantity of opaque liquid, said container including a transparent light inlet section for receiving light and a transparent light outlet section;

at least one heater element disposed in said opaque liquid; and

control means for controlling activation of said heater element

such that when said heater element is activated to increase its temperature beyond a predetermined level, a bubble is produced in said opaque liquid in alignment with said inlet and outlet section and adjacent to said heater element thereby allowing said incident light to be transmitted through said container and output through said outlet section as said output light.

4,589,731

LIGHT-SHIELDING COVER FOR SHEET-LIKE LIGHT GUIDE MEMBER

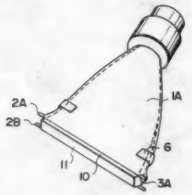
Yutaka Taniguchi, and Hisatoyo Kato, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Sep. 22, 1983, Ser. No. 534,856

Claims priority, application Japan, Sep. 27, 1982, 57-168139

Int. Cl.[4] G02B *5/14, 7/00*

U.S. Cl. 350—319 **5 Claims**



1. A light-shielding device comprising: a sheet-like light guide member made of a sheet-like transparent material so as to have a linear light input face and used for guiding light, which is emitted along a scanning line of stimulating rays from a stimulable phosphor sheet carrying a radiation image stored therein when said stimulable phosphor sheet is scanned with said stimulating rays, from said light input face to a light output face, a light-shielding cover comprising a flexible light-shielding member for covering the whole of the side faces of said sheet-like light guide member without closely contacting said side faces, and a pair of rod-like core metal members fitted to said flexible light-shielding member and sandwiching a portion near said linear light input face of said sheet-like guide member from both sides thereof.

4,589,732

LIQUID CRYSTAL OPTICAL PRINTING APPARATUS WITH ROD LENS

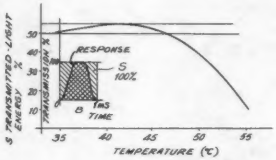
Yoshiaki Shiraishi, Shiojiri, and Kenji Aoki, Suwa, both of Japan, assignors to Seiko Epson Corporation, Tokyo, Japan

Filed Dec. 23, 1982, Ser. No. 452,370

Claims priority, application Japan, Dec. 28, 1981, 56-213263

Int. Cl.[4] G02F *1/13, 1/137;* G02B *27/00;* G02G *15/00*

U.S. Cl. 350—331 R **8 Claims**



1. A liquid crystal optical printing apparatus comprising:

a light source;

a shield plate positioned for blocking at least a portion of light emitted from said light source, said shield plate having a slit through which another portion of light from said light source passes;

a liquid crystal display panel subject to being irradiated with light emitted from said light source and passing through said slit, said liquid crystal panel having a plurality of light valves;

concentrating means disposed between said light source and said liquid crystal panel for focusing light from said light source on said liquid crystal panel, said concentrating means comprising a rod lens;

driver means for selectively opening and closing said light valves;

means for receiving images of said light valves for reproduction; and

lens means for focusing incident light from said liquid crystal display panel on said means for receiving images, said lens means comprising a plurality of self-focusing fiber lenses each of which produces an image of a light valve on said reproducing means, said light source, slit, concentrating means, liquid crystal panel and lens means being optically aligned.

4,589,733

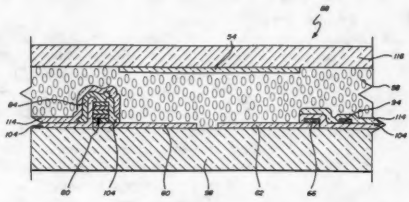
DISPLAYS AND SUBASSEMBLIES HAVING IMPROVED PIXEL ELECTRODES

Zvi Yaniv, Southfield, Mich.; Yair Bar-on, Haifa, Iceland; Vincent D. Cannella, Birmingham, and Gregory L. Hansell, Ann Arbor, both of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Filed Jun. 29, 1984, Ser. No. 626,133

Int. Cl.[4] G02F *1/133*

U.S. Cl. 350—332 **56 Claims**



1. In a display, a pixel comprising:

a first electrode including at least two spaced apart electrode portions;

a second electrode spaced from and facing said first electrode portions in substantially parallel relation thereto, said second electrode also being electrically insulated from all external circuit connections and from all other pixel electrodes; and

light influencing display material between said first electrode portions and said second electrode.

4,589,734

POLYCHROMATIC LIQUID CRYSTAL DISPLAY WITH REFLECTIVE ELECTRODE PADS

Barbara Needham, and Peter W. Ross, both of Bishops Stortford, England, assignors to International Standard Electric Corporation, New York, N.Y.

Filed May 27, 1983, Ser. No. 499,036

Claims priority, application United Kingdom, Jun. 15, 1982, 8217331; Sep. 2, 1982, 8225191

Int. Cl.[4] G02F *1/13*

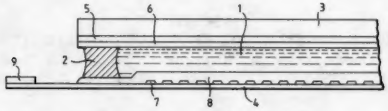
U.S. Cl. 350—336 **5 Claims**

1. A reflected light liquid crystal display device capable of exhibiting polychromatic images, comprising

a transparent front sheet having an inner surface on which a transparent electrode is located;

a silicon wafer layer spaced apart from the transparent front sheet and having an inner surface facing the transparent electrode;

a matrix array of separate metal electrode pads arranged in groups located on the inner surface of the silicon wafer layer, the inner surface of each separate pad of a group displaying a different one of a plurality of primary colors;
a liquid crystal layer sandwiched between the transparent electrode and the metal electrode pads and including a plurality of regions which are capable of assuming either one of a translucent or opaque state depending on the potential difference between the front electrode and the respective electrode pad; and



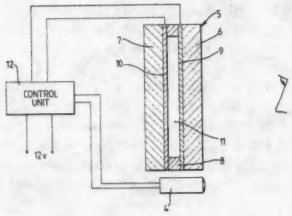
means for selective activation of the electrode pads of every group to cause a potential difference between the transparent electrode and the electrode pad so that the respective liquid crystal layer region overlying the activated pad will enter the translucent stage thereby revealing the color of the electrode pad, a plurality of the revealed electrode pads of a group forming a picture element of the respective polychromatic image, so that the color revealed by the picture element is determined by the cumulative effect of the colors of the activated pads in the group.

4,589,735

CHOLESTERIC LIQUID CRYSTAL MIRROR WITH SAFETY FEATURES

Frances C. Saunders, Malvern Wells, England, assignor to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, Great Britain

Continuation of Ser. No. 542,609, Oct. 17, 1983, abandoned. This application Oct. 11, 1985, Ser. No. 786,352
Claims priority, application United Kingdom, Oct. 20, 1982, 8229991
Int. Cl.[4] G02F *1/133*
U.S. Cl. 350—338 **4 Claims**



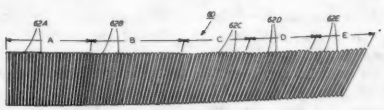
1. A variable reflectance mirror comprising:
a transparent front slide;
a rear slide;
a spacer for spacing apart said front and rear slides;
a layer of a cholestric liquid crystal material having a positive dielectric antisotrophy contained in the space formed by said spacer between said front and rear slides;
a transparent electrode structure on said front slide;
an electrode structure on said rear slide;
a highly reflecting surface on said rear slide;
the facing surfaces of both slides having a surface treatment that produces a tilt to the liquid crystal molecules in contact with said surface, said tilt being substantially between 20° and 75°; and
voltage control means for applying at least two discrete non-zero voltage levels to the cell electrodes including applying a first voltage level to the cell electrodes in order to rapidly establish a light transmissive state in said liquid crystal layer and applying a second voltage level, lower than said first voltage level, to the cell electrodes in order to rapidly establish a light scattering state in said liquid crystal layer, said voltage control means when not applying voltage to the cell electrodes results in said liquid crystal layer slowly relaxing to said light transmissive state.

4,589,736

TWO ROW REDUCTION/ENLARGEMENT GRADIENT INDEX LENS ARRAY HAVING SQUARE-ENDED FIBERS

Michael E. Harrigan, Webster; James D. Rees, Pittsford, and Melvin E. Deibler, Williamson, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Nov. 23, 1984, Ser. No. 674,436
Int. Cl.[4] G02B *6/04, 6/18;* G03B *27/00*
U.S. Cl. 350—413 **5 Claims**



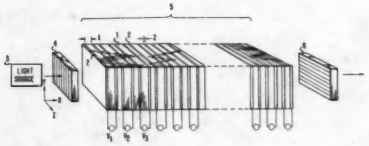
1. A reduction/enlargement lens array comprising a plurailty of gradient index optical fibers arranged in a fan-like configuration each fiber having planar faces perpendicular to the fiber axis, with the fibers joined together to form at least a single row, said fibers formed into a plurality of groups, each fiber in each group having the same length with the fiber lengths in each group becoming progressively shorter with increasing distance from the center group of the lens array.

4,589,737

DOPED AND UNDOPED SINGLE CRYSTAL MULTILAYERED STRUCTURES

Sanat K. Sashital, Thousand Oaks, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.

Filed May 1, 1984, Ser. No. 605,736
Int. Cl.[4] G02F *1/03*
U.S. Cl. 350—356 **24 Claims**



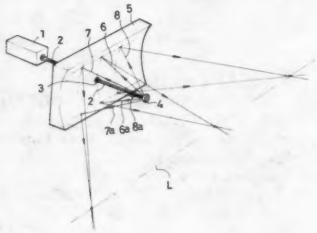
1. A multi-layer electro-optical crystalline material comprising a plurality of adjacent, single crystal layers wherein each crystal layer has different electrical and optical properties from its adjacent layer or layers, said layers epitaxially grown from a molten solution including said electro-optical crystalline material and at least one dopant, with adjacent ones of said layers differing in composition from essentially pure said electro-optical crystalline material to said electro-optical crystalline material containing substantial amounts of said at least one dopant.

4,589,738

APPARATUS FOR PROJECTING A LASER BEAM IN A LINEAR PATTERN

Yasuto Ozaki, 22-2, Horen-cho, Nara, Japan

Filed Nov. 4, 1983, Ser. No. 548,871
Claims priority, application Japan, Nov. 4, 1982, 57-195043
Int. Cl.[4] G02B *17/06*
U.S. Cl. 350—443 **6 Claims**



1. An apparatus for projecting a laser beam linearly on an object to be measured, said apparatus comprising:

means for generating a laser beam with generatrices;

a convex reflector means for scattering the laser beam radially into a plurality of luminous lines;

a reflector, positioned between the generating means and the convex reflector means, said reflector having at least one cylindrical-concave reflective surface, such that it causes the plurality of luminous lines to converge along a common line of light on the object in a direction perpendicular to the generatrices of the laser beam; and

path means, arranged in the reflector having at least one cylindrical-concave reflective surface, for allowing the laser beam to proceed from the generating means through the reflector to the convex reflector means for scattering the laser beam radially;

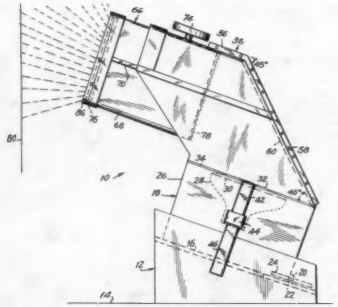
whereby a predetermined optical image is cast on the object to be measured by the common continuous line of light which is constant and nonflickering.

4,589,739

TELEVISION MAGNIFICATION APPARATUS

Steven Goodman, 85 Oak St., Norwood, N.J. 07648

Filed Sep. 9, 1985, Ser. No. 773,800
Int. Cl.[4] G02B *3/08*
U.S. Cl. 350—452 **13 Claims**



1. Apparatus for magnifying and projecting an image from a screen of a television receiver, comprising:

only two circular Fresnel lenses for magnifying and projecting said image from said screen, said lenses being substantially flat and parallel to each other, and spaced apart a predetermined fixed distance generally greater than the approximate size of the lenses;

each Fresnel lens having a smooth surface and an opposite rough surface, and the rough surfaces of the two Fresnel lenses facing away from each other;

reflecting means for reflecting said image from said screen to said two Fresnel lenses; and

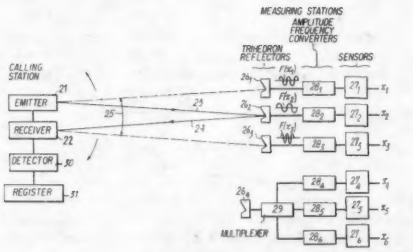
housing means for supporting said two Fresnel lenses in said spaced apart relationship and said reflecting means with respect to said screen.

4,589,740

TRIHEDRON-SHAPED DEFORMABLE REFLECTORS

Pierre Durremberger, St. Etienne les Orgues, France, assignor to Office National d'Etudes et de Recherche Aerospatiales (ONERA), France

Filed Jul. 22, 1983, Ser. No. 516,370
Claims priority, application France, Jul. 22, 1982, 82 12832
Int. Cl.[4] G02B *26/08*
U.S. Cl. 350—487 **5 Claims**



1. A deformable trihedral reflector suitable for the retroreflection of an electromagnetic incident beam or a system for modulating the angle of divergence of a reflected beam comprising: a tri-rectangular trihedron having first, second and third reflecting planar faces arranged so that the first and second faces are substantially orthogonal, the second and third faces are substantially orthogonal, and the first and third faces are substantially orthogonal, at least one part of the trihedron including a piezoelectric material, and means connected to activate said piezoelectric material for controlling the dihedral angles between the faces of the trihedron in the vicinity of the orthogonality and to consequently control the reflected beam divergence angle, the trihedral reflector being a hollow portion in a stack of piezoelectric plates, said plates being perpendicular to the ternary axis of symmetry of the trihedron, the means for activating the piezoelectric material being connected to the plates to change the thickness of the plates.

4,589,741

UNIVERSAL REVOLVING MICROSCOPE STAGE

John E. Clegg, 2320 Keystone Dr., Orlando, Fla. 32806

Filed Dec. 21, 1984, Ser. No. 685,007
Int. Cl.[4] G02B *21/26*
U.S. Cl. 350—532 **1 Claim**

1. A universal revolving microscope stage comprising;

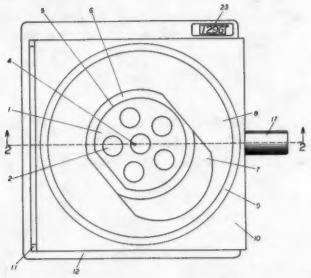
a. A horizontal carrier (10) mounted at opposite sides on two parallel recessed tracks (11) in a rectangular housing (12) in which said carrier (10) moves linearly,

b. A circular revolving stage (9) with a circular track (14) located on the bottom thereof mounted inside said carrier (10),

c. A roller (13) mounted on a horizontal revolving bushing (15) attached to the bottom of said carrier (10), with said roller (13) engaging said track (14) as means of revolving said stage (9),

d. A fixed bushing (16) with internal threads mounted on the bottom of said carrier (10), and

e. A horizontal revolving shaft (18) with a threaded portion



(22) engaging the internal threads of said bushing (16) as means of imparting linear movement to said carrier (10), and with a flat-sided portion (20) engaging a key (21) of said bushing (15) as means of revolving said stage (9).

4,589,742

MICROSCOPE FOR OBSERVING ENVIRONMENTALLY SENSITIVE OBJECTS

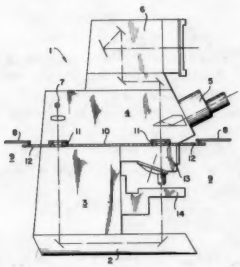
Klaus Schindl, Vienna, Austria, assignor to C. Reichert Optische Werke, AG, Vienna, Austria

Filed Aug. 24, 1984, Ser. No. 643,911

Claims priority, application Fed. Rep. of Germany, Aug. 30, 1983, 3331193

Int. Cl.[4] G02B *23/16, 21/00*

U.S. Cl. 350—589 4 Claims



1. A microscope adapted to observe objects located in a non-ambient environment while the observer is located in the ambient environment, which comprises:

a base,

a stage mounted on said base for supporting objects to be observed,

a support extending from said base,

a sealing member having one side attached to said support,

a microscope body attached to said sealing member on the side opposite said support, said body having an illumination source and imaging optics for observing an object,

an objective mounted on said support on the same side of said sealing member as the support,

window means in said sealing member for optically connecting the illumination source and imaging optics to said objective, and

a planar flange extending from said sealing member for engagement with an environmental chamber seal.

4,589,743

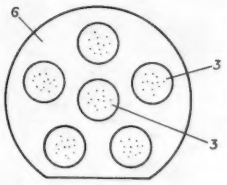
CIRCULAR MICROSCOPE SPECIMEN SLIDE

John E. Clegg, 2320 Keystone Dr., Orlando, Fla. 32806

Filed Mar. 8, 1985, Ser. No. 709,963

Int. Cl.[4] G02B *21/34*

U.S. Cl. 350—536 1 Claim



1. A circular microscope specimen slide (6) defined by a circular edge and a straight edge (5) and having five recessed circular viewing chambers (3) arranged in a circle around one central recessed circular viewing chamber (3): said viewing chambers (3) having a planar base and a vertical cylindrical side wall.

4,589,744

TELESCOPE WITH ADJUSTABLE RETICULE

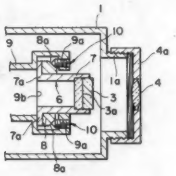
Akio Kimura, and Yoshio Horihawa, both of Tokyo, Japan, assignors to Tokyo Kogaku Kikai Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 6, 1985, Ser. No. 708,849

Claims priority, application Japan, Mar. 8, 1984, 59-32381[U]

Int. Cl.[4] G02B *27/36*

U.S. Cl. 350—566 4 Claims



1. A telescope comprising:

a lens-barrel including an objective lens having an optical axis and an ocular;

a reticule disposed at the ocular side in the lensbarrel and including a cross line for collimation;

a reticule holding member including a front surface parallel to the reticule surface and a rear surface having at its periphery an inclined portion inclining with respect to said cross line surface and disposed within said lens-barrel for holding said reticule;

a reticule holding member fitting portion disposed within said lens-barrel and receiving said reticule holding member by abutting against said front surface of said reticule holding member; and

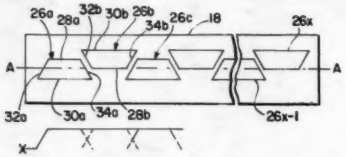
an adjusting member abutted against the inclined portion of said rear surface of said reticule holding member from the ocular side toward the optical axis direction to move said reticule holding member in order to adjust said cross line to the optical axis.

4,589,745

GEOMETRIC LED LAYOUT FOR LINE EXPOSURE

William T. Plummer, Concord, Mass., assignor to Polaroid Corporation, Cambridge, Mass.

Filed Jan. 25, 1985, Ser. No. 695,072
Int. Cl.[4] G03B *41/00*
U.S. Cl. 354—4 10 Claims



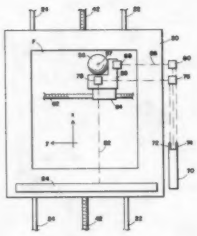
1. A line exposure array comprising:
an elongated substrate; having a longitudinal axis and
a plurality of light emitting elements disposed in spaced apart relation along the longitudinal axis of said substrate, each of said light emitting elements being defined by two substantially parallel spaced apart edge lines extending generally in directions parallel to the longitudinal axis of said substrate and interconnected at respective ends thereof by skewed edge lines extending in directions generally oblique to the longitudinal axis of said substrate.

4,589,746

DUAL-AXIS, SINGLE MIRROR INTERFEROMETER MEASURING SYSTEM

Robert J. Pavone, South Windsor, Conn., assignor to The Gerber Scientific Instrument Company, South Windsor, Conn.

Filed May 7, 1982, Ser. No. 375,981
Int. Cl.[4] G03B *41/00*; G01B *11/02*
U.S. Cl. 354—4 15 Claims



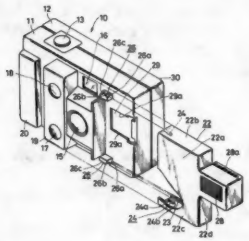
11. A photoplotter comprising:
a stationary frame;
a work table defining a support surface for holding a film during plotting and movable back and forth on the frame in a first coordinate direction by a first drive motor;
a photohead movable back and forth on the frame over the table in the second coordinate direction by a second drive motor; and
a dual-axis, single elongated mirror interferometer system for measuring movements of the film and the photohead relative to one another including:
a first interferometer mounted on the plotting carriage and having a measuring axis extending from the carriage in the first coordinate direction parallel with the support surface of the work table;
a reflective mirror mounted along one edge of the work table and having a reflective surface elongated in the second coordinate direction and extending perpendicular to and being intersected by the measuring axis of the first interferometer for measuring movements of the table relative to the photohead in the first coordinate direction; and
a second interferometer and an associated reflector mounted with the measuring axes of the interferometer extending in the second coordinate direction between the stationary frame and the photohead at each position of the photohead for measuring movements of the head relative to the frame.

4,589,747

ELECTRONIC FLASH INCORPORATED CAMERA

Yasuhiko Nakayama; Fumio Takami, and Masashi Shigeno, all of Nagano, Japan, assignors to Chinon Kabushiki Kaisha, Japan

Filed Apr. 19, 1984, Ser. No. 602,013
Claims priority, application Japan, Apr. 26, 1983, 58-62692[U]
Int. Cl.[4] G03B *15/05, 17/04*
U.S. Cl. 354—149.11 11 Claims



1. An electronic flash incorporated camera, comprising:
a camera body having a lens;
a case for said camera body, said case having an external contour;
a lens protective cover having an electronic flash emission member, said cover being slidably mounted on the front of said case, said cover being slidable between a closed position in which said cover covers said lens, and a retracted position in which said lens is exposed;
first guide means for guiding said protective cover;
second guide means for guiding said emission member;
said emission member being positioned so as to project beyond said external contour of said case when said cover is in said retracted position.

4,589,748

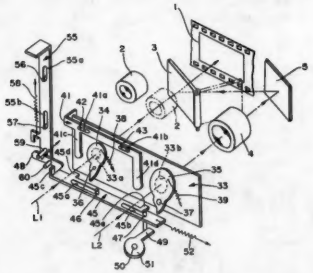
EXPOSURE CONTROL DEVICE FOR CAMERA

Hiroshi Ohmura, Tokyo, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Division of Ser. No. 595,543, Mar. 27, 1984. This application Jun. 25, 1985, Ser. No. 748,698
Claims priority, application Japan, Mar. 31, 1983, 58-45832
Int. Cl.[4] G03B *3/00, 9/10, 9/58*
U.S. Cl. 354—195.12 6 Claims

1. In a camera having a first objective lens of a relatively long focal length, a second objective lens of a relatively short focal length, said first and second objective lenses being arranged side by side and having parallel optical axes, and means selectively to establish an optical path to a film through either of said first and second lenses; the improvement comprising: a shutter apparatus comprising a mounting plate having openings, said plate being disposed so that said openings are in alignment with the optical axes of said first and second lenses, respectively, a first shutter pivotally mounted on said plate, means displacing said first shutter between two positions wherein said first shutter respectively opens and closes a light path of the first lens; a second shutter pivotally mounted on said plate, means displacing said second shutter between two

positions wherein said second shutter respectively opens and closes a light path of the second lens; and means simultaneously displacing said first and second shutters from said closed positions to said open positions, said simultaneous displacing means comprising a driving lever slidably movable in



a direction perpendicular to the optical axes of said first and second objective lenses, said driving lever having projection arms which are adapted to abut said first and second shutters, respectively, and a spring urging said projection arms against said first and second shutters.

4,589,749

CAMERA VIEWFINDER

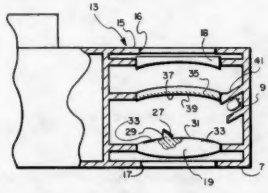
Joseph R. Strobel, Stuttgart, Fed. Rep. of Germany, assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Mar. 8, 1985, Ser. No. 709,853

Claims priority, application Fed. Rep. of Germany, Jun. 7, 1984, 3421214

Int. Cl.⁴ G03B *13/14*

U.S. Cl. 354—221 **10 Claims**



1. In a camera of the type wherein a viewfinder includes (a) a near-subject frame for framing a subject closer to said camera than a predetermined distance and (b) a distant-subject frame for framing a subject farther from the camera than the predetermined distance, and wherein focus-setting means has (a) a near-subject setting corresponding to the closer subject and (b) a distant-subject setting corresponding to the farther subject, the improvement comprising:

partially-reflecting mirror means, disposed to form respective images of said near-subject and distant-subject frames by reflection, for viewing a closer or farther subject through said mirror means with a frame image surrounding the viewed subject;

means defining a path for light;

means positioning said distant-subject frame for illumination by light in said path to make the frame visible for reflection by said mirror means whenever said focus-setting means is set to its near-subject or distant-subject setting;

means for preventing light in said path from making said near-subject frame visible for reflection by said mirror means; and

means, responsive to said focus-setting means being set to its near-subject setting, for directing light outside said path to illuminate said near-subject frame and make the frame visible for reflection by said mirror means.

4,589,750

ADAPTER FOR CONNECTING SINGLE-LENS REFLEX CAMERA LENS TO VIDEO CAMERA

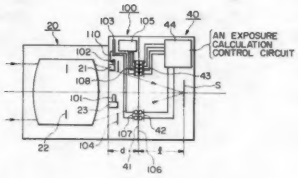
Yasumasa Tomori; Sadao Okudaira; Harumi Aoki; Fumio Urano, and Tahei Morisawa, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Apr. 28, 1984, Ser. No. 594,052

Claims priority, application Japan, Mar. 28, 1983, 58-52003

Int. Cl.⁴ G03B *17/26, 9/02*; H04N *5/238*

U.S. Cl. 354—271.1 **7 Claims**



1. An adapter for connecting an interchangeable lens for which a first distance from the rear surface of the lens to a focal plane is relatively great to a camera body for which a second distance from the front surface of a lens mount to a focal plane is relatively small, comprising:

compensating means for optically compensating for a difference between said first and second distances;

a diaphragm and an electric motor for controlling an aperture value provided by said diaphragm;

aperture value data transmitting means for transmitting aperture value data provided by an aperture value setting member of said interchangeable lens to said camera body as electrical data; and

electrical contacts for transmitting said electrical data to said camera body and receiving an operating signal for said motor from said camera body.

4,589,751

ATTACHMENT DEVICE FOR INTERCHANGEABLE OPTICAL DEVICE

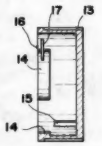
Tsuneyo Metabi, Sakai, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed May 29, 1984, Ser. No. 614,560

Claims priority, application Japan, Jun. 1, 1983, 58-84222[U]

Int. Cl.⁴ G03B *11/04*

U.S. Cl. 354—295 **9 Claims**



1. A lens rear cap for use with an interchangeable lens barrel which is attachable to a camera body, said lens barrel including a diaphragm mechanism having a plurality of diaphragm blades overlapping to form a diaphragm, and a diaphragm interlocked member interlocked with said diaphragm blades and urged in a direction to stop-down said diaphragm, said lens rear cap comprising a body portion attachable to said interchangbeable lens barrel and a diaphragm retaining member which is provided on said body portion and engageable with

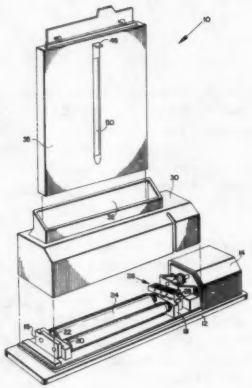
said diaphragm interlocked member to move the latter to a position for opening said diaphragm larger than the minimum aperature to be formed by said diaphragm, when said lens rear cap is attached to said interchangeable lens barrel.

4,589,752

FILM PROCESSOR WITH S-CURVE FLUID APPLICATOR PAD

Philip R. Norris, North Reading, and Vincent L. Cocco, Wakefield, both of Mass., assignors to Polaroid Corporation, Cambridge, Mass.

Filed Dec. 24, 1984, Ser. No. 685,852
Int. Cl.[4] G03D *3/12, 5/06*
U.S. Cl. 354—303 12 Claims



1. Photographic processing apparatus comprising:

a container having an elongated opening through which an exposed film unit may be introduced thereinto, leading edge first;

a pair of elongated rollers rotatably mounted within said container, said rollers being disposed in substantially parallel alignment to each other and to said elongated opening, said rollers further being spaced apart so that an exposed film unit may be introduced into said container in a direction to pass intermediate said rollers; and

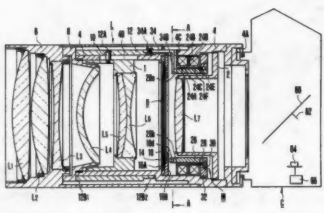
an elongated fluid applicator pad adapted to be wetted with processing fluid and having its opposite ends connected to respective said rollers and coiled around said rollers in an S-shaped manner so that one side thereof faces inwardly as it passes around a first of said rollers and outwardly as it passes around the second of said rollers, whereby, when the section of said pad immediately extending from said first roller is wetted with fluid and the exposed film unit is introduced into said container so that its leading edge engages said pad intermediate said rollers and said first roller is actuated to effect the coiling of said wetted pad section therearound, the exposed film unit will be coiled around said first roller in face-to-face superposed relationship with said wetted section of said pad, and subsequent actuation of said second roller to effect the coiling of said wetted pad section therearound will effect the advancement of the exposed and now fluid treated film unit outwardly of said container through its said opening, trailing edge first.

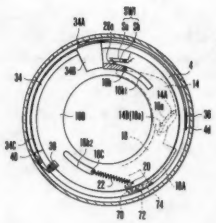
4,589,753

LENS MOUNTING HAVING A REVERSIBLE MOTOR FOR CONTROLLING FOCUSING AND APERTURE SETTING OF A CAMERA

Tohru Kawai, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 13, 1984, Ser. No. 670,741
Claims priority, application Japan, Nov. 14, 1983, 58-175552[U]
Int. Cl.[4] G03B *3/10*
U.S. Cl. 354—400 5 Claims





1. A lens mounting cooperative with a focusing control circuit, comprising:

(a) a lens holder containing a focusing lens;

(b) a control sleeve rotatable about an optical axis for controlling the axial movement of said lens holder;

(c) a diaphragm device including diaphragm blades, a drive ring for driving said diaphragm blades, and means for urging said diaphragm blades in a direction to a prescribed aperture value;

(d) a motor arranged upon rotation about the optical axis in one direction to perform a focusing function, and upon rotation in the reverse direction to control said diaphragm device, a stator of said motor being fixed at the inside of said lens mount while a rotor thereof being formed in a ring-shaped magnet through which the reflected light from an object passes;

(e) first transmitting means for connecting said control sleeve and said rotor of the motor and being rotated about the optical axis by the rotation of said rotor thus rotating said control sleeve;

(f) first arresting means responsive to a signal from said focusing control circuit for arresting and holding said focusing lens in the in-focuc position;

(g) second transmitting means for transmitting rotating power of said motor to said drive ring; and

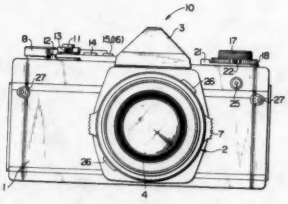
(h) second arresting means for arresting and holding said diaphragm blades in a size of aperture opening against said urging means.

4,589,754

CAMERA

Yoshihisa Maitani; Katsuhiko Tsunefuji, and Masafumi Yamasaki, all of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Apr. 15, 1983, Ser. No. 485,432
Claims priority, application Japan, Apr. 21, 1982, 57-65385
Int. Cl.[4] G03B *17/20*
U.S. Cl. 354—431 **2 Claims**



1. A camera including selection means which permits a selection among a plurality of photographing modes which may include an automatic mode, a manual mode, an average photometry mode and a spotwise photometry mode; comprising:

a photographing information display located within the viewfinder of the camera and including fixed photographing indicia and a plurality of display elements which are arranged in linear succession;

means for activating those display elements of the display which begins at a display region located at one end of the display and extends to another location in the display corresponding to one of said indicia for representing photographing information, thereby displaying photographing information in a bar-like form;

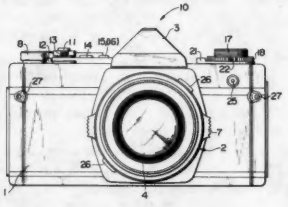
and means responsive to a mode changing operation by said selection means for indicating such mode changing, once devativting all of said display elements and subsequently activating those display elements which begin from the display region located at one end of the display to a further location in said display corresponding to photographing information which is to be used in the new photographing mode.

4,589,755

CAMERA

Yoshihisa Maitani; Katsuhiko Tsunefuji, and Masafumi Yamasaki, all of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Division of Ser. No. 485,432, Apr. 15, 1983. This application Oct. 12, 1984, Ser. No. 660,841
Claims priority, application Japan, Apr. 21, 1982, 57-65385
Int. Cl.[4] G03B *7/08, 7/28, 17/20*
U.S. Cl. 354—431 **10 Claims**



1. A camera including spotwise photometric means for providing a brightness value and means for calculating an exposure value reponsive to brighness values, comprising:

means for displaying each of the brightness values which are obtained by spotwise photometry of an object being photographed at a plurality of locations and for displaying a result of an arithmetic operation performed on the respective brightness values by said calculating means;

exposure correction means for selectively providing a correction of an exposure factor at the option of the operator, which correction is set in accordance with the result of a calculation effected by said calculating means; and

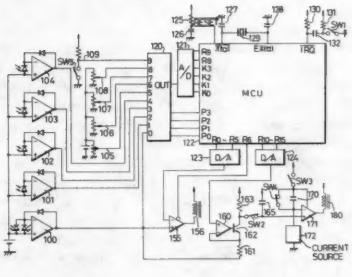
said displaying means displaying the brightness values without incorporating any correction and displaying the result of the operation performed by said calculating means showing the correction incorporated.

4,589,756

METHOD AND APPARATUS FOR THE AUTOMATIC CONTROL OF EXPOSURE IN CAMERA

Takashi Saegusa, Kawasaki, Japan, assignor to Nippon Kogaku K. K., Tokyo, Japan

Filed Sep. 14, 1984, Ser. No. 650,852
Claims priority, application Japan, Sep. 20, 1983, 58-173665
Int. Cl.[4] G03B *7/28, 7/08*
U.S. Cl. 354—432 **23 Claims**



1. A camera having means for measuring light from an object passed through a diaphragm aperture of a phototaking lens and generating a measuring output, means for setting a film sensitivity, means for stopping down said diaphragm aperture and means for controlling a shutter, the camera comprising:

(a) operating means for effecting an operation for obtaining a shutter speed in accordance with said set film sensitivity and said measuring output when said stopping down means has completed stopping down the diaphragm aperture;

(b) means for detecting that a brightness indicated by said measuring output before stopping down of said aperture by said stopping down is outside of a predetermined range and generating a detection signal; and

(c) correcting means for controlling said operating means in response to said detection signal to correct the shutter speed obtained by said operating means.

4,589,757

CAMERA

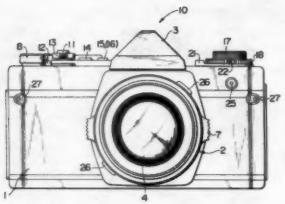
Yoshihisa Maitani; Katsuhiko Tsunefuji, and Masafumi Yamasaki, all of Hachioji, Japan, assignors to Olympus Optical Co., Ltd., Tokyo, Japan

Division of Ser. No. 485,432, Apr. 15, 1983. This application Oct. 12, 1984, Ser. No. 661,038

Claims priority, application Japan, Apr. 21, 1982, 57-65385

Int. Cl.[4] G03B *7/093, 17/20*

U.S. Cl. 354—458 **5 Claims**



1. A camera in which an exposure level is automatically controlled, comprising:

photometry means for generating a photometric value responsive to the reflection of light from an image to be photographed;

a command member having set and reset positions;

said set position selecting a memory mode which is capable of performing a plurality of successive exposures at the exposure level according to the photometric value established by the photometry means at the selection of the memory mode;

means for receiving exposure factors used to determine an exposure perod such as preset diaphragm aperture and film speed;

a shutter including a release member for initiating operation of the shutter;

storage means responsive to operations of the command member to the set position and the shutter release member for storing at least the aforementioned exposure level;

means for calculating an exposure period employing the aforementioned data stored in said storage means and the exposure factors and for storing the calculated exposure period in said storage means;

means responsive to subsequent operation of the shutter release member for controlling the shutter to be opened for the exposure period which was previously stored in said storage means as long as said command member is not reset;

said calculating means including means responsive to changed exposure factors received by said receiving means for altering the exposure period based upon said altered exposure factors and said exposure level previously stored in said storage means for calculating an exposure period for controlling the shutter during the next operation of the shutter release member.

4,589,758

IMAGE FORMING APPARATUS HAVING A PAIR OF OPENABLE HOUSING SECTIONS

Nobuhiro Kasama, Yokohama, and Mitsuru Kurata, Kawasaki, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 19, 1984, Ser. No. 662,502

Claims priority, application Japan, Oct. 25, 1983, 58-199579

Int. Cl.[4] G03G *15/20*

U.S. Cl. 355—3 FU **16 Claims**

1. An image forming apparatus comprising:

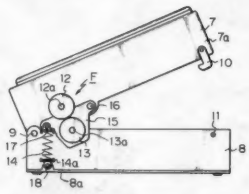
a housing capable of being divided to open, said housing having,

a first housing,

a second housing openable and closable with respect to said first housing around an axis,

image forming means for forming on an image bearing member a toner image corresponding to image information to be recorded, and

fixing means for fixing the toner image formed on said image bearing member, said fixing means comprising first and



second rotatable members for conveying said image bearing member while pinching and pressing it;

locking means for locking said second housing to said first housing; and

resilient means for pressing said first rotatable member and said second rotatable member when the second housing is locked by said locking means to the first housing, and for urging said second housing to open it with respect to the first housing when said locking means is released.

4,589,759

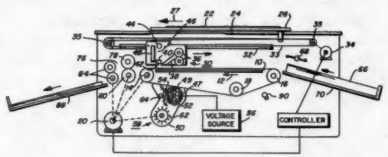
REPRODUCING APPARATUS WITH OPTIC SCANNING MODULE

Joseph Fantuzzo, Webster; Edwin R. Monkelbaan, Fairport, and Henry R. Till, Rochester, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed Aug. 31, 1984, Ser. No. 645,891

Int. Cl.[4] G03G *15/00*

U.S. Cl. 355—8 **14 Claims**



1. An electrostatographic reproducing apparatus comprising

a transparent viewing platen for supporting a document thereon to be reproduced,

a photoconductive belt positioned below said viewing platen arranged to move in a recirculating path completing two cycles for each copy produced,

an optical scanning module positioned between said viewing platen and said photoconductive belt including means for scanning said viewing platen from a start of scan to an end of scan position to reproduce an image of a document on said platen on said photoconductive belt, means to develop said image with charged toner particles on said photoconductive belt, said optical scanning module futher including copy sheet registration rolls,

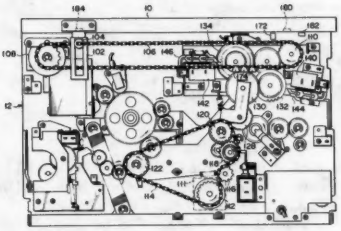
a copy sheet feeder at the end of scan position, means to actuate said copy sheet feeder to feed a copy sheet to said registration rolls when said optical scanning module is at the end of scan position, means to activate said registration rolls to capture at least the lead edge of said copy sheet, means to return said optical scanning module to the start of scan position, means to feed the lead edge of said copy sheet in said optical module in timed relation and into contact with the lead edge of said toner image on said

photoconductive belt, and means to transfer said toner image from said belt to said copy sheet.

4,589,760
IMAGE FORMING APPARATUS

Akiro Iimori, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Aug. 19, 1983, Ser. No. 524,778
Claims priority, application Japan, Aug. 31, 1982, 57-150965
Int. Cl.[4] G03G *15/04*
U.S. Cl. 355—8 **7 Claims**



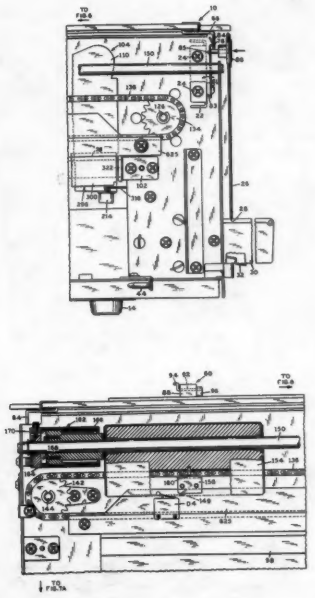
1. An image forming apparatus comprising:
a document table on which an original document is disposed and which is reciprocatingly movable;
an illuminating station for illuminating said original document;
reciprocating means having a chain to reciprocate said document table across the illuminating station in accordance with the traveling of said chain;
a drive source for generating a drive force;
coupling means for connecting said drive source to said reciprocating means and including at least first and second spring clutches to drive said chain in one direction at first and second speed modes;
control means for changing said first speed mode to said second speed mode by actuating said second spring clutch while said first spring clutch is continuously activated and then deactuating said first spring clutch after a predetermined period has elapsed from the actuation of said second spring clutch, said predetermined period corresponding to the actuation response time of said second spring clutch; and
image processing means for producing a replica through slit exposure by movement of the document table in accordance with the image of the original document.

4,589,761
RECIPROCATING OPTICS COPIER WITH MEANS FOR COUNTERACTING ACCELERATION REACTION FORCES

Benzion Landa, Edmonton, Canada, assignor to Savin Corporation, Stamford, Conn.

Division of Ser. No. 268,261, May 29, 1981, Pat. No. 4,435,068. This application Mar. 2, 1984, Ser. No. 585,858
Int. Cl.[4] G03G *15/04*
U.S. Cl. 355—8 **4 Claims**

1. Copying apparatus including in combination a generally horizontally disposed platen for receiving a document to be copied, a scanning subassembly, means mounting said scanning subassembly adjacent to said platen for reciprocating movement along a generally horizontal path, means for driving said subassembly along said path to scan a document on said platen, acceleration of said subassembly producing forces of reaction, and means responsive to said driving means for generating forces which are substantially equal in magnitude and opposite



in direction to said forces of reaction to counterbalance forces of reaction incident to acceleration of said subassembly.

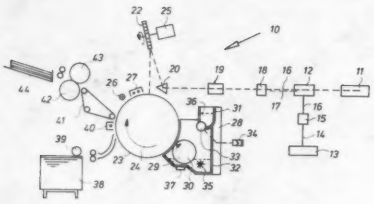
4,589,762
TONER DISPENSING CONTROL

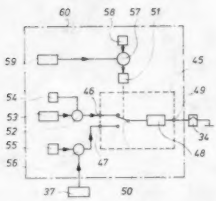
Lucien A. De Schamphelaere, Edegem; Freddy M. Librecht, Boechout, and Willy G. Verlinden, Edegem, all of Belgium, assignors to Agfa-Gevaert N.V., Mortsel, Belgium

Filed May 24, 1984, Ser. No. 613,736
Claims priority, application European Pat. Off., Jun. 3, 1983, 83200801.5
Int. Cl.[4] G03G *15/08*
U.S. Cl. 355—14 D **9 Claims**

6. In a xerographic printer of the type wherein a photoconductor is electrostatically charged and image-wise exposed by line-wise exposing the same by means of activation in response to corresponding data bit signals of a plurality of discrete spotlike sources of radiation spaced along said line of exposure, and developed by contact with toner particles attracted thereto from a mixture of magnetically-susceptible carrier particles and toner powder in a developing station, and said developing station including a toner dispenser operative to add fresh toner powder to said mixture to replenish the content of toner powder therein as the same is consumed during printing, in combination, a toner dispensing control system comprising: a measuring circuit for measuring the relative electrical permeability of the toner mixture and for comparing the measured value with a reference value and producing upon deviation of the measured value from the reference value a first control signal, a pre-settable counter for counting the number of data bit signals activating said radiation sources during exposure of the photoconductor and for producing when said counted number reaches a pre-set magnitude a second control signal, a controller for operating said toner dispenser, means for applying said first and second control signals to said controller according to a predetermined ratio to form a combined signal

for controlling said dispenser and means for adjusting said ratio after a predetermined elapsed period of use of a given toner





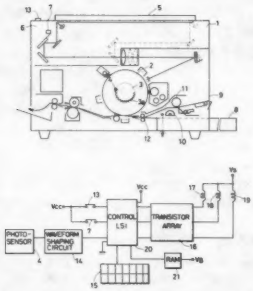
mixture to compensate for accumulated errors in at least said first control signal occurring during said elapsed period of use.

4,589,763

TIMING ADJUSTMENT IN A COPYING MACHINE

Katsuyoshi Fujiwara, Osaka, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Oct. 14, 1983, Ser. No. 542,206
Claims priority, application Japan, Oct. 14, 1982, 57-181067
Int. Cl.⁴ G03G *15/00, 21/00*
U.S. Cl. 355—14 R **4 Claims**



1. A timing adjustment system for a copying machine comprising:

a slit plate secured to a shaft of a photosensitive drum of the machine, said slit plate having a plurality of slits formed with a predetermined distance therebetween;

detection means for detecting said slits formed in said slit plate and for developing slit detection pulses of a period (t') when said slit plate rotates;

optical system start detecting means for developing an optical system start signal when an optical system of the machine starts its movement;

memory means for memorizing a desired delay time from the development of said optical system start signal to a supply timing of a copy paper, said memory means including:

a first memory section for memorizing a pulse number (N_0) of the slit detection pulses;

a second memory section for memorizing a time period (T_0) from the development of the N_0-th slit detection pulse to the supply timing of the copy paper;

mode selection means for selectively placing the copying machine in a preset mode;

input means for modifying said pulse number (N_0) to a modified pulse number (N_1) and for modifying said time period (T_0) to a modified time period (T_1), in said preset mode to take into account actual operating conditions of said copy machine; and

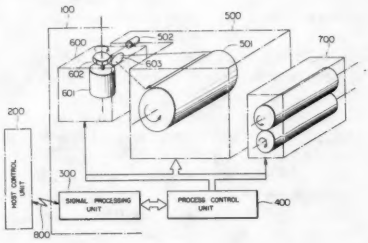
control means, responsive to said input means, for developing a control signal and for performing the copy paper supply when said desired delay time, equalling $N_1 \cdot t' + T_1$, has passed after the development of said optical system start signal.

4,589,764

LASER BEAM PRINTER CONTROL APPARATUS

Hiroyuki Tadokoro, and Kenichi Akahori, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Oct. 19, 1984, Ser. No. 662,941
Claims priority, application Japan, Oct. 19, 1983, 58-194176
Int. Cl.⁴ G03G *15/00*; G01D *15/06*
U.S. Cl. 355—14 R **6 Claims**



1. A laser beam printer including:

printing process execution means for conducting a xerographic process, said printing process execution means having a photosensitive member, a laser light source, a scanning unit, and a fusing unit;

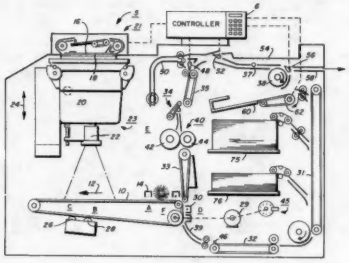
process control means for controlling the operation of said printing process execution means; and

signal processing means for receiving, analyzing and decoding a printing signal fed from the outside of said printer and for supplying a printing start signal to said process control means upon receiving printing start data, wherein said signal processing means further comprises provisional start signal producing means for supplying a provisional start signal to said process control means irrespective of contents of said printing signal upon starting reception of said printing signal, and said process control means further comprises means, responsive to said provisional start signal, for producing control signals for raising the temperature of said fusing unit to an operation temperature and for starting the operation of said scanning unit, and means for producing other control signals for lowering the temperature of said fusing unit to a value lower than said operation temperature and for stopping the operation of said scanning unit, provided that said printing start signal is not supplied within a preset time after a printing termination or within another preset time after the application of said provisional start signal.

4,589,765
SHEET FEEDER CONTROL FOR REPRODUCTION MACHINES

William D. Perun, Webster, and Ronald P. Booth, Sr., Pittsford, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.

Filed May 22, 1985, Ser. No. 736,995
Int. Cl.[4] G03G *15/00*
U.S. Cl. 355—3 SH 8 Claims



1. In a method for operating a reproduction machine of the type which produces copies of originals on copy sheets supplied by at least one copy sheet feeder, said reproduction machine including a copy processing path along which said copy sheets are transported when processing copies; memory means for storing operating parameters for actuating the components of said machine including said sheet feeder in selective fashion to produce copies; clock means for generating clock counts for operating said components in predetermined timed relation; and control means for operating said machine to produce copies in accordance with the copy run programmed; said sheet feeder including a tray for holding a supply of copy sheets and sheet transport means actuable on a predetermined one of said clock counts to feed one of said copy sheets to said copy processing path; comprising the steps of:

(a) measuring the current sheet feeding interval required for said sheet feeder to deliver a copy sheet to said copy processing path following actuation thereof;

(b) comparing said current sheet feeding interval with an optimum sheet feeding interval stored in said memory means; and

(c) adjusting said predetermined one clock count so that said current sheet feeding interval is substantially equal to said optimum sheet feeding interval.

4,589,766
COPYING METHOD AND ARRANGEMENT FOR COLORED ORIGINALS

Manfred Fürsich, Taufkirchen; Günter Findeis, Sauerlach; Helmut Treiber, Munich; Berthold Fergg, Taufkirchen, and Siegfried Thurm, Meerbusch, all of Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Continuation of Ser. No. 610,402, May 15, 1984, abandoned. This application Sep. 16, 1985, Ser. No. 778,156
Claims priority, application Fed. Rep. of Germany, May 17, 1983, 3317804
Int. Cl.[4] G05B *27/78*
U.S. Cl. 355—38 17 Claims

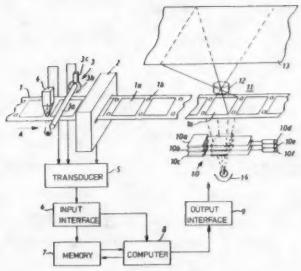
1. A method of copying colored originals constituting part of the same photosensitive article, particularly for use in copying frames of the same strip of color film, said method comprising the steps of:

(a) measuring the transparency of said article in each of the primary colors at a multiplicity of regions characteristics of the portion of said article having said originals, each of said originals containing at least some of said regions, and the measuring step being performed by directing measuring light in each primary color along a respective measuring path to a measuring device for the color, said measuring light being derived from a first light source;

(b) processing the measurements generated during the measuring step to obtain a set of data characteristic of said portion of said article and indicative of the color compositions of said regions;

(c) calculating the amount of copying light required in each primary color to achieve at least approximately neutral gray copies of those regions of each original having an at least approximately neutral gray color composition, the calculating step being performed using said set and the measurements for the respective originals; and

(d) copying said originals onto copying material using the amounts of copying light derived from the calculating



step, said copying light being derived from a second light source and being directed along a copying path separate from said measuring paths, and the measuring step including filtering the measuring light in each primary color upstream of the corresponding measuring device to thereby adjust the spectral sensitivity of each measuring device so as to at least approximate the spectral sensitivity of said copying material in the respective color, said filtering comprising developing theoretical filtering curves of transmissivity versus wavelength designed to equalize the spectral sensitivities of said measuring devices and the corresponding spectral sensitivities of said copying material taking into account differences in the spectra of said light sources, and spectral differences between the transmissivities of said copying path and transmissivities of said measuring paths.

4,589,767
READER-PRINTER

Masaaki Yanagi, Tokyo; Satoshi Ono, Yokohama; Takao Toda; Kazuo Kashiwagi, both of Tokyo; Makoto Endo, Yokohama, and Yoshihiro Saito, Hachioji, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 483,122, Apr. 8, 1983, abandoned. This application Sep. 17, 1985, Ser. No. 777,028
Claims priority, application Japan, Apr. 22, 1982, 57-67651; Apr. 22, 1982, 57-67655; Apr. 23, 1982, 57-69118; Apr. 28, 1982, 57-72367
Int. Cl.[4] G03B *13/28*
U.S. Cl. 355—45 27 Claims

1. A reader-printer in which the image of an original is selectively projected onto a photosensitive medium or a screen, said reader-printer comprising:

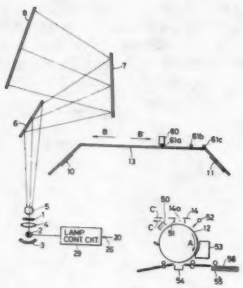
illumination means for illuminating the original;

optical means forming a first optical path for projecting the image of the original which is illuminated by said illumination means onto the screen when said reader-printer is operated in reader mode, and for forming a second optical path for projecting said image onto the photosensitive

medium when said reader-printer is operated in printer mode, said optical means comprising a reflecting member for reflecting the light from the original;

driving means for moving said reflecting member, said driving means moving said reflecting member to an exposure starting position in the printer mode and thereafter moving it from said exposure starting position to an exposure ending position in order to perform slit exposure;

illumination control means for controlling said illumination means from the start of a change from the reader mode to the printer mode, to the start of the exposure of the image



onto the photosensitive medium, while causing said illumination means to illuminate the original with a constant quantity of light;

photo-detecting means for detecting the light from the original when the original is illuminated with the constant quantity of light in accordance with said illumination control means; and

printer control means for controlling the operation of said reader-printer on the basis of an output from said photo-detecting means while causing said reader-printer to form the proper image on the photosensitive medium.

4,589,768

ORIGINAL TRANSFER APPARATUS

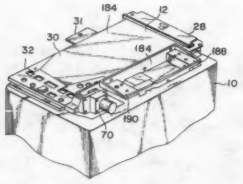
Yasuhiro Iwata; Toshiyuki Watanabe, both of Yokohama, and Seiichi Kobayashi, Mitaka, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 1, 1984, Ser. No. 667,445

Claims priority, application Japan, Jan. 9, 1984, 59-1659

Int. Cl.[4] G03B *27/48, 27/50*

U.S. Cl. 355—50 **10 Claims**



1. An original transfer apparatus used in an image-forming apparatus for forming an image in accordance with image information from an original set on an original table, whereby the original is transferred to the original table, comprising:

a housing attached to the image-forming apparatus, said housing being provided with a hinge for supporting the housing so that the housing can swing relative to the original table when the housing is attached to the image-forming apparatus;

a transfer mechanism disposed in the housing, said transfer mechanism including an inlet unit for swallowing the original, a transfer unit for transferring th original swallowed by the inlet unit to the original table, and an outlet unit for discharging the original on the original table therefrom; and

a drive source integrally provided in the housing and adapted to drive the transfer mechanism.

4,589,769

EXPOSURE APPARATUS

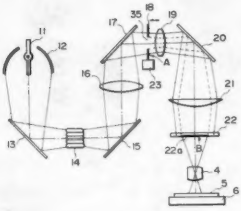
Toshio Matsuki, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 14, 1984, Ser. No. 640,611

Claims priority, application Japan, Aug. 23, 1983, 58-152474

Int. Cl.[4] G03B *27/72*

U.S. Cl. 355—71 **15 Claims**



1. An exposure apparatus for exposing a wafer to light passed through a reticle having a circuit pattern formed thereon, said apparatus comprising:

a light source for supplying light to irradiate the reticle with the light; and

light-intercepting means disposed between said light source and the reticle, for at least partially intercepting the light supplied from said light source, said light-intercepting means having a first pair of light-blocking plates to oblong shape and a second pair of light-blocking plates of oblong shape, said first and second pairs of light-blocking plates being cooperative with each other and being movable independently from each other to define an aperture of variable shape for allowing passage of at least a portion of the light supplied from said light source, each of said light-blocking plates of said first and second pairs having a side edge effective to define a portion of said aperture;

said first pair of light-blocking plates being disposed on said second pair of light-blocking plates so that the side edges of said light-blocking plates of said first and second pairs, defining said aperture, are located substantially in the same plane.

4,589,770

ELECTRO-OPTICAL RANGING APPARATUS HAVING SCANNING CIRCUITRY AND SERVOLOOP PROCESSOR FOR RESOLVING SEPARATION OF IMAGES ON PHOTOELECTRIC DETECTOR ARRAYS

Philip Jones, Bothell; William R. Jones, Kent, and Moorfield Storey, Jr., Seattle, all of Wash., assignors to The Boeing Company, Seattle, Wash.

Filed Oct. 25, 1982, Ser. No. 436,600

Int. Cl.[4] G01C *3/00;* G03B *13/18*

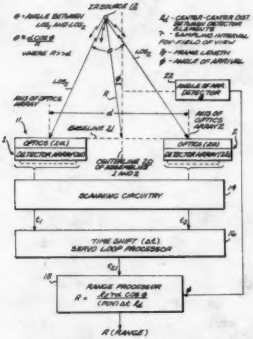
U.S. Cl. 356—1 **2 Claims**

1. An electro-optical apparatus for measuring the range R to a distant source of light, comprising:

first and second optical/detector assemblies, each of which comprises optics having an optical axis, a field of view FOV and frame length l_f, and an array of photoelectric detector elements arranged at a center-to-center distance l_d along a predetermined scanning direction on a focal plane normal to said optical axis and upon which an image of said source is focused by said optics, said first and

second assemblies being arranged with said optical axes parallel and spaced apart by a predetermined distance d along a baseline that in turn defines a perpendicular bisector, said assemblies adapted for being oriented so that said perpendicular bisector defined by said baseline points generally in the direction of a distant source of light such that images of the source are focused by said optics on said arrays at relatively different positions with respect to corresponding points on said arrays wherein such difference in the image positions is defined by an image offset Δx;

scanning circuitry means connected to said detector elements of said arrays of said first and second assemblies for electrically, sequentially sampling output signals at a predetermined sampling interval τ from said array of said detector elements of said first assembly, and in unison therewith sequentially sampling output signals at said interval τ from said array of detector elements of said second assembly so as to produce a first time/amplitude-varying signal t_1 representing the image position on said array of said first optical/detector assembly and so as to produce, in concert therewith, a second time/amplitude-varying signal t_2 representing the image position on said array of said second optical/detector assembly wherein said signals t_1 and t_2 exhibit a phase difference referred to as time-shift Δt that in turn represents said offset Δx of



images on said arrays, said scanning circuitry means comprising the subcombination of:

a first channel having a first plurality of preamplifiers individually connected to said detector elements of said first optical/detector assembly, and a first plurality of signal control gates connected individually in series between said first plurality of preamplifiers and a first, signal-combining junction;

a second channel comprising a second plurality of preamplifiers connected individually to said detector elements of said second optical/detector assembly, and a second plurality of signal-controlled gates connected individually in series between said second plurality of preamplifiers and a second signal-combining junction;

gate signal sequencer means having a plurality of gate-controlling output leads connected to corresponding ones of said first and second plurality of gates such that said sequencer means actuates a set of corresponding gates from said first and second channels simultaneously and operates different gates in said first and second channels sequentially to sample the output signals through said first and second pluralities of preamplifiers and associated detector elements from both said first and second optical/detector assemblies in unison, whereby the sampled signals from said first and second assemblies appear at said first and second signal-combining junctions, respectively; and

output means for communicating said first and second signal-combining junctions to first and second outputs of said scanning circuitry at which time/amplitude-varying signals are produced representing the positions of the source image on said optical/detector assemblies, said output means comprising the subcombination of:

reversing switching means coupling said first and second signal-combining junctions to said first and second outputs and having a first switching state in which said first signal-combining junction is coupled to said first output of said scanning circuitry and said second signal-combining junction is coupled to said second output of said scanning circuitry, and having a second state in which said signal-coupling relationship is reversed; and

reversing switching control means coupled to said sequencer means for changing said reversing switching means from said first state to said second state at predetermined times so that said time/amplitude-varying signals appearing at said first and second outputs of said switching circuitry means always exhibit the same leading-trailing phase relationship;

a servoloop processor having inputs connected to receive said signals t_1 and t_2 from said scanning circuitry means and having an output at which a signal is produced representing said time shift Δt measured from said input signals t_1 and t_2, said servoloop processor comprising the subcombination of:

variable delay means connected to a first input of said processor for variably delaying that one of said input signals t1 and t2 that leads the other input signal;

difference-taking means for receiving the variably delayed signal from said variable delay and the trailing signal from a second input to said processor for producing an error signal corresponding to the phase difference therebetween;

differentiator means connected to said second input of said processor for differentiating the signal thereat to produce a reference signal having substantially the same phase as said error signal;

multiplier means connected to said difference-taking means and to said differentiator for multiplying said error signal with said reference signal to produce a correction signal;

integrator means connected to said multiplier means for receiving and integrating said correction signal, said integrator means having an output producing an integrated correction signal that is connected to said variable delay means for controlling the amount of delay produced thereby; and

said output of said processor connected to said output of said integrator means for providing at said processor output said time-shift signal Δt as said integrated correction signal; and

a range processor having an input connected to said time-shift servoloop processor for receiving said signal representing said time shift Δt and having means responsive thereto for producing an output signal representing range R as a function of said time-shift signal Δt in accordance with the relationship:

$$R=(l_f r d/(\mathrm{FOV})\,\Delta t\, l_d).$$

4,589,771

ELECTRO-OPTICAL LIQUID DETECTOR ASSEMBLY

Takashi Watanabe, Kariya, and Yoshihiro Sasage, Hamana, both of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Jun. 22, 1984, Ser. No. 623,561
Claims priority, application Japan, Jun. 28, 1983, 58-116456
Int. Cl.[4] G01N *21/00*
U.S. Cl. 356—38 **6 Claims**

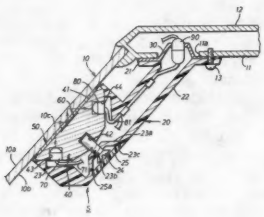
1. An electro-optical liquid detector assembly comprising:

a transparent substrate having a front surface attached to a

portion of the interior surface of a wind-shield where the exterior surface of said wind-shield is wiped by a wiper blade;

a light emission element assembled within said substrate to emit luminous rays towards said wind-shield so as to cause internal reflection of the luminous rays between the interior and exterior surfaces of said wind-shield;

a light receiving element assembled within said substrate to receive the incident luminous rays reflected by the exterior surface of said wind-shield so as to produce an electric signal indicative of an amount of the incident luminous rays; and



a transparent resilient plate interposed between the interior surface of said wind-shield and the front surface of said substrate;

a holder fixedly mounted on a stationary member adjacent the outer circumference of the interior surface of said wind-shield to support said substrate thereon and push it towards the interior surface of said wind-shield through said resilient plate; and

means responsive to the electric signal from said light receiving element for producing an electric control signal in dependence upon a value of the electric signal.

4,589,772

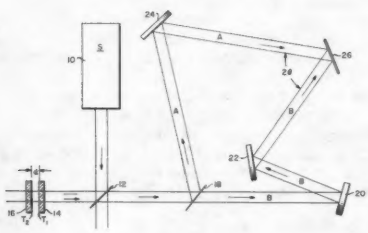
PULSED REMOTE GAUGE

Raymond A. Patten, Oxon Hill, Md., and Jerry A. Blodgett, Annandale, Va., assignors to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed May 25, 1972, Ser. No. 257,998

Int. Cl.[4] G01B *9/02, 11/02*

U.S. Cl. 356—353 **2 Claims**



1. A method for measuring the separation between two light-reflecting surfaces the optical axes of which coincide using a single laser pulse comprising the steps of:

projecting the laser pulse on said surfaces normal to said surfaces;

separating the reflected light into two beams;

projecting said beams upon the same area of a photographic film, the angles of incidence, θ, of each beam with the normal to the film being equal and known;

developing said film;

irradiating said developed film with CW laser light;

using a light detector to indicate the intensity of the light which is diffracted by the film;

measuring the distance, χ, between the points of highest light intensity between adjacent interference-fringe regions formed by the light which is diffracted by the film; and

solving the formula $d=\chi \sin \theta$ for the term d, which is the separation between the light-refecting surfaces.

4,589,773

POSITION DETECTING SYSTEM

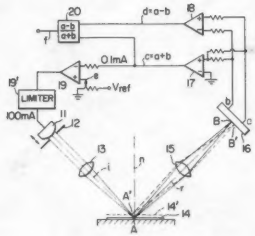
Satoshi Ido, Tokorozawa; Minpei Fujinami, Iruma; Yasuo Kato, Zama; Yoshio Sakitani, Iruma, and Susumu Ozasa, Kashiwa, all of Japan, assignors to Nippon Telegraph & Telephone Public Corporation and Hitachi, Ltd., both of Tokyo, Japan

Filed Dec. 22, 1981, Ser. No. 333,295

Claims priority, application Japan, Feb. 23, 1981, 56-24329

Int. Cl.[4] G01B *11/00, 15/00*

U.S. Cl. 356—371 **10 Claims**



1. A system for detecting a height position of a workpiece suitable for use in an electron beam exposure apparatus which includes an electron beam source for forming an electron beam having a depth of focus in an evacuatable chamber and a movable table for supporting said workpiece to irradiate said workpiece with said electron beam, the system comprising:

means for emitting a light beam to form a light spot on a surface of a workpiece, said light beam means including a light source for emitting said light beam and a stop for restricting said emitted light beam, said stop delimiting the diameter of said light spot on the surfaces of the workpiece to be smaller than or equal to nine times the depth of focus of the electron beam at a position on the surface;

light detecting means having a detecting surface;

optical means for focusing light reflected from the surface of the workpiece on said detecting surface of said light detecting means to form an image of said light spot thereon, said light detecting means generating a first signal related to an intensity of said light spot on said detecting surface and a second signal related to a position and the intensity of said light spot on said detecting surface;

negative feedback means for feeding said first signal back to said light beam means to maintain constant the intensity of said light spot on said detecting surface; and

circuit means for dividing said second signal with said first signal to form a third signal independent of the intensity of light on said detecting surface and indicative of the height position of the workpiece,

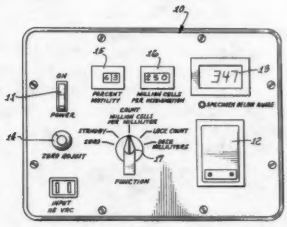
whereby an accurate indication of the height position of the workpiece is obtained independently of variations in reflectivity of the surface of the workpiece or when different reflectivity surface portions of the workpiece are mixed together in the area of said light spot formed on the surface of the workpiece.

4,589,774

SPERM DENSIMETER

James N. Dupree, South El Monte, and Jack E. Peterson, West Covina, both of Calif., assignors to Dupree, Inc., Chino, Calif.

Filed Apr. 30, 1984, Ser. No. 605,123
Int. Cl.[4] G01N *21/00*
U.S. Cl. 356—436 **12 Claims**



1. In an apparatus for measuring density of sperm in a sample, the combination of:

an optical assembly having a light source, a specimen holder and photodetector;

first amplifier means having a reference signal and the output of said photodetector as input, and providing an absorbance output signal substantially proportional to the light absorbance of a sample in said specimen holder;

second, third and fourth amplifier means defining three parallel signal channels, each having said absorbance output signal as an input, and each including means for adjusting the slope and vertical offset of the output thereof with respect to the input thereto;

channel selector means having the outputs of said second, third and fourth amplifier means as inputs and providing one of said inputs as a selected output as a function of the amplitude of said absorbance output signal;

display means for displaying a number as a function of an input thereto; and

means for connecting said selected output of said channel selector means to said display means as an input.

4,589,775

APPARATUS AND METHOD FOR ACCUMULATING AND MEASURING SIDESTREAM SMOKE PRODUCED BY A SMOKING MATERIAL

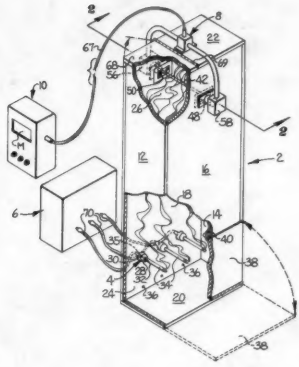
Leon A. Milhous, Jr.; John M. Martin, and Clifton T. Mansfield, all of Winston-Salem, N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Nov. 23, 1983, Ser. No. 554,549
Int. Cl.[4] G01N *21/00*
U.S. Cl. 356—439 **26 Claims**

1. A method of measuring the relative amount of sidestream smoke produced by a smoking material such as a cigarette, smoking tobacco or the like, said method comprising the steps of

burning the smoking material to produce mainstream smoke and sidestream smoke;

segregating the sidestream smoke from the mainstream smoke and accumulating the segregated sidestream smoke produced from the burning smoking material; and



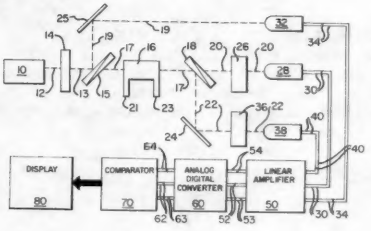
measuring the relative amount of the accumulated sidestream smoke.

4,589,776

METHOD AND APPARATUS FOR MEASURING OPTICAL PROPERTIES OF MATERIALS

David Carver, and Thomas A. Tait, both of Fort Collins, Colo., assignors to Chiratech, Inc., Fort Collins, Colo.

Filed Sep. 27, 1982, Ser. No. 424,919
Int. Cl.[4] G01N *21/21*
U.S. Cl. 356—367 **29 Claims**



26. The method of measuring the parameters of absorption, depolarization and rotation of a beam of light in an optically active material comprising the steps of:

producing a collimated primary beam of plane-polarized light;

passing said primary beam through a sample of said material;

splitting said primary beam into first, second and third test components after said beam has passed through said material;

passing each of said second and third test components through a polarizing element;

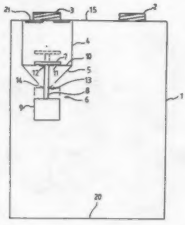
producing a first signal corresponding to the intensity of said first test component and second and third signals corresponding to said second and third test components after each of said second and third test components has passed through its respective polarizing element; and

comparing said first, second and third signals to determine said parameters.

4,589,777
MIXING APPARATUS

Francis C. Soler, Mt Curl Rd., 2 R.D., Marton, New Zealand

Filed Jun. 29, 1984, Ser. No. 625,976
Claims priority, application New Zealand, Jul. 4, 1983, 204797
Int. Cl.[4] B01F *15/04*
U.S. Cl. 366—160 8 Claims



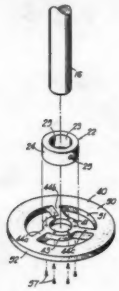
1. A portable apparatus for mixing two liquids in a desired volumetric ratio, the apparatus comprising:

an outer container with a permanently fixed top end; an inner container of smaller volume within the outer container and permanently fixed to the underside of the top end; two filling openings in the top end with each opening provided with a closure, one opening leading directly into the outer container and the other directly into the inner container; a passage in the bottom of the inner container; and a float-operated valve mechanism which does not control either filling opening but controls the passage in such a way that the passage is closed when the outer container is empty, but is opened and remains open to allow liquid in the inner container to be discharged into the outer container as the outer container is filled with liquid.

4,589,778
STIRRING DEVICE FOR SAND MILL

Phillip G. Mitchell, P.O. Box 612, Opelika, Ala. 36801

Continuation of Ser. No. 610,783, May 16, 1984, Pat. No. 4,499,445. This application Jan. 9, 1985, Ser. No. 689,990
The portion of the term of this patent subsequent to Feb. 12, 2002, has been disclaimed.
Int. Cl.[4] B01F *7/16*
U.S. Cl. 366—316 4 Claims



1. A stirring device, for being received on a rotatable shaft of a stirring machine for rotation with the shaft, said shaft protruding into a container in which a stirrable substance is disposed, comprising:

(a) a collar having a central hole therein through which the collar is adapted to receive said shaft, said collar having an outwardly extending base surface;

(b) a circular, unitary, plastic, stirrer member having a hub with a central hole therein conforming to the contour and size of said hole of said collar, said stirrer member having an inner surface along one side thereof, said stirrer member being secured to said central collar so that the central hole of said collar and said stirrer member are concentric;

(c) securing means securing said hub in said collar with said base surface contacting a surface on said hub, said stirrer member extending radially beyond said collar;

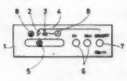
(d) said stirrer member including an outer ring spaced radially outward of said collar and said hub, and

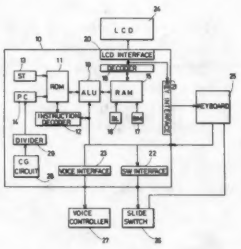
(e) said stirrer member including means for joining said ring and said hub, said means for joining said ring and said hub having circumferentially spaced openings.

4,589,779
MULTI-ALARM TIMEPIECE WITH SIMPLIFIED OPERATING MEANS

Koichi Hatta, Yamatokoriyama, and Yutaka Ikemoto, Nara, both of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Mar. 14, 1983, Ser. No. 475,157
Claims priority, application Japan, Mar. 15, 1982, 57-41366; Mar. 17, 1982, 57-43293
Int. Cl.[4] G04B *23/02*
U.S. Cl. 368—74 2 Claims





1. An electronic timepiece comprising:

message storing means for storing data representing a plurality of predetermined alarm messages;

output means operatively associated with said message storing means for outputting any of said messages in the form of audible messages; and

control means for said timepiece, said control means consisting essentially of:

a mode selecting switch for selectively setting said timepiece in any of a plurality of alarm modes, a time correcting mode, and a normal timekeeping mode;

a time setting switch means cooperable with said mode selecting switch in each of said alarm modes for setting an alarm time for each of said alarm modes;

said time setting switch means being further cooperable with said mode selecting switch in said time correcting mode for adjusting the actual time displayed by said timepiece and inoperative in said normal mode; and

a sole additional switch cooperable with said mode selecting switch in each of said alarm modes for selectively activating each of said alarm modes; said sole additional switch being inoperative in said time correcting mode and said normal mode;

said mode selecting switch and said sole additional switch being jointly operable to selectively activate any or all of

said plurality of alarm modes for selectively activating said output means to output any or all of said plurality of messages from said message storage means associated with said respective alarm modes.

4,589,780

MEANS FOR GENERATING AN INTERMITTENT ALARM SOUND FOR A TIMEPIECE

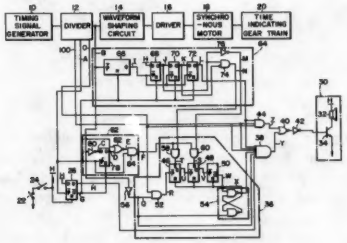
Katsuhiko Takebe, Tokyo, Japan, assignor to Rhythm Watch Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 439,124, Nov. 4, 1982, abandoned. This application Oct. 15, 1985, Ser. No. 787,699

Claims priority, application Japan, Nov. 20, 1981, 56-172721[U]

Int. Cl.⁴ G04B *23/02*

U.S. Cl. 368—245 **5 Claims**



1. In a timepiece of the type including a time indicating circuit which generates a pulse signal and an electronic alarm sound generating means, said alarm sound generating means comprising:

a switching circuit which consists of a counter for outputting a sound switching signal at every predetermined period by counting the pulse signals supplied from the time indicating circuit and a flip-flop group for counting said sound switching signal and for outputting a coded signal corresponding to the lapse of time from alarm starting;

a preset counter for counting the pulse signals of the time indicating circuit and for being preset to a value which is determined by said coded signals;

a preset control circuit for supplying a preset control signal to said preset counter to enable said coded signal from said switching circuit to be supplied to setting terminals of said preset counter at every fixed intermittent period by utilizing pulse signals from the time indicating circuit;

a gate means for outputting intermittent sound signals together with an audible frequency signal at the time said preset counter is counted up to after said preset counter is preset; and

an electronic sounding circuit for performing the sounding action in response to the audible frequency signal from said gate means;

whereby the number of times said sounding action occurs in a fixed intermittent period can be increased along with the lapse of time from the beginning of alarm operation.

4,589,781

PORTABLE HEAT FLUXMETER FIXTURES

Russel T. Mack, Lake Jackson, Tex., assignor to The Dow Chemical Company, Midland, Mich.

Filed Feb. 25, 1985, Ser. No. 705,754

Int. Cl.⁴ G01K *17/08, 17/20*

U.S. Cl. 374—29 **18 Claims**

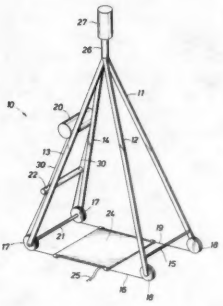
1. Apparatus for measuring heat flux from a surface, comprising:

(a) a support fixture having leg means;

(b) planar fluxmeter means supported by said fixture and having a face thereon adapted to be contacted against a surface to measure heat flux therefrom;

(c) handle means connected to said fixture for enabling hand held operation thereof by a user;

(d) means for controlling an engagement force urging said fluxmeter means toward said surface, said means providing in repeatable fashion an approximately constant said



engagement force to said fluxmeter means such that contact of the face thereof against the surface is consistently loaded; and

(e) mounting cables extending between said legs means wherein said mounting cables support said fluxmeter means, and further wherein said fluxmeter means and said cables are bendable to enable conformance against a curved surface on contact thereagainst.

4,589,782

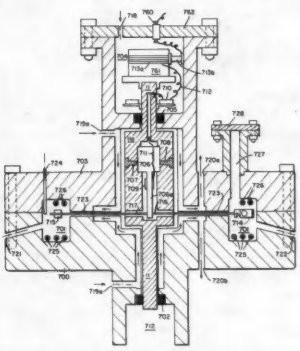
THERMOCENTRIFUGOMETRIC ANALYSIS

Jin Y. Park, Moscow, Id., assignor to Research Corporation, N.Y.

Continuation-in-part of Ser. No. 504,233, Jun. 14, 1983, abandoned. This application Jun. 11, 1984, Ser. No. 618,961

Int. Cl.⁴ G01N *25/00*

U.S. Cl. 374—14 **75 Claims**



1. A method for measuring a change in mass of a test sample when the sample is subjected to at least one selected temperature and fluid, said process comprising:

(a) rotating a test sample about an axis to subject the sample to centrifugal force;

(b) subjecting the test sample to at least one selected temperature and fluid to effect a change in mass of the test sample;

(c) measuring a displacement force generated during the

rotation of the test sample to determine a change in mass during an interval of time;

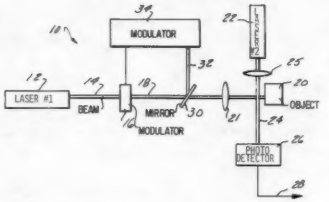
whereby any change in mass in the test sample may be measured by a derivative value of the displacement forces generated at the beginning and end of said time interval.

4,589,783

THERMAL WAVE IMAGING APPARATUS

Robert L. Thomas, Huntington Woods; Pao-Kuang Kuo, Troy, and Lawrence D. Favro, Huntington Woods, all of Mich., assignors to Wayne State University, Detroit, Mich.

Filed Apr. 4, 1984, Ser. No. 596,515
Int. Cl.[4] G01N *21/00, 25/00*
U.S. Cl. 374—45 **1 Claim**



1. In a thermal wave imaging apparatus for detecting surface and subsurface cracks, flaws and voids in opaque solid objects in which A.C. electrical signals indicative of the configuration of the surface and subsurface of an opaque, solid object are generated by a thermal wave scan of the object in which a first laser generates a heating energy beam directed through the object to generate a surface temperature gradient, a second optical probe beam is directed through the object and deflected by the surface temperature gradient, and means for generating the A.C. electrical signals indicative of the amount of deflection of the second optical probe beam, the improvement comprising:

means for converting A.C. electrical signals to digital signals;

memory means for storing the digital signals;

central processor means for controlling the transfer of the digital signals to the memory means;

means for displaying an image of the surface and subsurface of the object; and

means for generating control signals for controlling the X and Y axis point deflection of the displaying means and for addressing the memory means to output therefrom the digital signals to control the intensity of each displayed point on the displaying means;

modulation means for modulating the laser output beam to a pulsed beam which strikes and heats a localized point on the object;

means for controlling the amplitude of the output beam from the modulation means,

the means for controlling the amplitude of the optical output beam of the modulation means comprises:

means for detecting the amplitude of the optical beam output from the modulation means;

means for generating an RF signal for controlling the modulation means; and

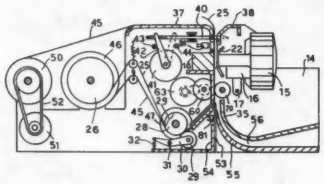
means, responsive to the detecting means, for attenuating the RF signal so as to control the modulation means such that the output optical beam from the modulation means remains at a constant amplitude despite fluctuations in the output optical beam from the laser.

4,589,784

POINT OF SALE PRINTER

Franco Valle, Ivrea, and Sergio Sofi, Turin, both of Italy, assignors to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy

Filed Jan. 11, 1984, Ser. No. 569,857
Claims priority, application Italy, Jan. 11, 1983, 67018 A/83
Int. Cl.[4] B41J *11/20*
U.S. Cl. 400—56 **3 Claims**



1. A point of sale printer comprising:

a frame;

a platen fixedly mounted on said frame;

a printing head disposed in front of said platen;

a carriage on which said printing head is mounted;

a guide bar for guiding said carriage and the printing head mounted thereon parallel to said platen along a rectilinear printing path which comprises a first printing zone and a second printing zone adjacent therebetween;

a first motor roller for feeding a first continuous document from a first supply roll toward said first printing zone, wherein said first continuous document has a first transverse width;

a second motor roller for feeding a second continuous document from a second supply roll toward said second printing zone, wherein said second continuous document has a second transverse width and wherein said first and second motor rollers are rotatably mounted on said frame and are disposed coaxial and adjacent therebetween;

first guide means for guiding said first and second continuous documents from said first and second motor rollers to said first and second printing zones along a substantially planar trajectory lying on a surface tangent to the platen, wherein said two documents have two adjacent edges between the first printing zone and the second printing zone and two external edges, and wherein said adjacent edges and said two external edges lay in said planar trajectory;

feeding means for feeding a discrete document between said platen and said printing head in correspondence with both said first printing zone and said second printing zone, wherein said feeding means comprises:

a motor shaft rotatably mounted on said frame parallel to said first and second motor rollers at a side of said planar trajectory including said platen, wherein said motor shaft extends beyond the external edges of said first and second continuous documents;

three feeding rollers coaxially mounted on said motor shaft in two lateral positions beyond the external edges of said first and second documents along said trajectory and in a space between the adjacent edges of said first and second documents, wherein each feeding roller comprises a projecting portion projecting from said surface tangent to said platen and said first and second continuous documents in such a manner that said three feeding rollers do not interfere with said first and second continuous documents,

a pair of levers pivotally mounted on said frame and disposed perpendicularly to said motor shaft,

a pinch roller rotatably mounted on said pair of levers substantially parallel to said motor shaft, and

spring means for constantly urging said pair of levers and

said pinch roller toward the projecting portion of said feeding rollers,

wherein said guide bar is mounted on said pair of levers parallel to said pinch roller in such a manner that, when said discrete document is inserted into the machine, it is engaged between said feeding rollers and said pinch rollers without interference with the first and second motor rollers, and said carriage and said printing head are spaced away from said platen by a distance equal to the thickness of the introduced discrete document; and

optical means for detecting an edge of said discrete document, said optical means being disposed in correspondence with said space and said planar trajectory in such a manner that said optical means do not interfere with said first and second continuous documents.

4,589,785

PRINTING APPARATUS

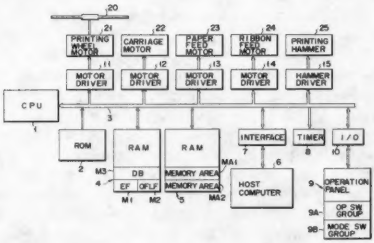
Masafumi Sato, Fuji, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan

Filed Mar. 18, 1985, Ser. No. 713,306

Claims priority, application Japan, Mar. 29, 1984, 59-59615

Int. Cl.[4] B41J *5/30, 5/46*

U.S. Cl. 400—61 **3 Claims**



1. A printing apparatus comprising:

printing means;

an operation panel including a plurality of switches;

memory means having first and second memories; and

control means which respectively stores switch data corresponding to the states of the switches of said operation panel and print control data into said first and second memories when a power source is turned on, changes the print control data in said second memory in accordance with a command, and drives said printing means in accordance with an input print data and with the print control data stored into said second memory, thereby printing said input print data,

wherein said control means comparing the states of said switches at the time when an operation mode is changed from an off-line state to an on-line state with the switch data in said first memory, changes the switch data having the contents different from the states of said switches among the switch data in said first memory in accordance with the states of said switches, and changes only the corresponding print control data in said second memory in accordance with said changed switch data.

4,589,786

IMPACT PRINTER HEAD CAPABLE OF PRINTING A DOT AT A DISTANCE NARROWER THAN A THICKNESS OF A PRINTER UNIT

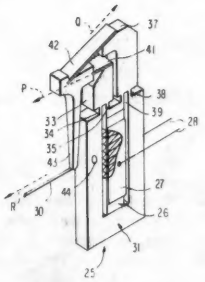
Izumu Fukui; Takeshige Hamatsuki; Takeshi Yano; Eiichi Sato, and Osamu Inui, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Aug. 5, 1983, Ser. No. 520,772

Claims priority, application Japan, Aug. 5, 1982, 57-136723; Jun. 10, 1983, 58-103809; Jun. 17, 1983, 58-108685; Jul. 29, 1983, 58-139038; Jul. 29, 1983, 58-139039

Int. Cl.[4] B41J *3/12*

U.S. Cl. 400—124 **12 Claims**



1. An impact printer head comprising:

a plurality of printer units, each having a base line defining a thickness and a width perpendicularly of said thickness and comprising a longitudinal-effect electroexpansive transducer, a printing rod having a printer end, and coupling means for mechanically coupling said printing rod with said transducer so as to move said printing end between a rest and an actuated position along a line of displacement in compliance with operation of said transducer;

supporting means for supporting said printer units along the base lines thereof so that the printing ends of the respective printer units are positioned coplanar in a predetermined configuration when said printing ends are moved to the actuated positions, respectively; and

energizing means for selectively energizing the transducers of said printer units into operation to make the printing rod coupled to the energized transducer print a dot on a recording medium moved relative to said printer head along a printer line, said predetermined configuration being such as to make two adjacent dots printed on said recording medium transversely of said printing line have a predetermined distance smaller than said thickness;

wherein said supporting means comprises:

a base plate defining a support surface; and

an arcuate bolt which is extended through the respective printer units along the base lines thereof to said base plate and which is fastened to said base plate with an acute angle formed between each adjacent pair of said printing rods so that said predetermined distance is smaller than said thickness.

4,589,787

PRINTER WITH ROTATABLE PRINT BAND

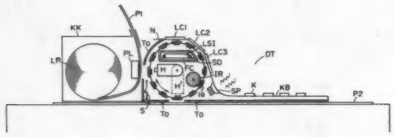
Mitsuaki Seki, Tokyo; Satoshi Watanabe, Chichibu, and Hideaki Miyakawa, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo and Canon Denshi Kabushiki Kaisha, Saitama, both of, Japan

Continuation of Ser. No. 732,799, May 10, 1985, abandoned, which is a continuation of Ser. No. 599,217, Apr. 13, 1984, abandoned, which is a continuation of Ser. No. 459,588, Jan. 20, 1983, abandoned, which is a continuation of Ser. No. 175,521, Aug. 5, 1980, abandoned. This application Sep. 24, 1985, Ser. No. 779,316

Claims priority, application Japan, Aug. 8, 1979, 54-101104; Aug. 9, 1979, 54-101660; Aug. 9, 1979, 54-101661; Nov. 16, 1979, 54-148660

Int. Cl.[4] B41J *1/20*

U.S. Cl. 400—145.2 4 Claims



1. A printer, comprising:

a rotatable base having a circumferential surface with a plurality of holes therethrough;

a flexible type belt having a front surface and a back surface, said back surface having a plurality of projections thereon each positioned to engage an associated on of said plurality of holes, said front surface having a plurality of types each corresponding to a different one of said plurality of projections;

hammer means movably arranged within said base for assuming a first printing position and a second printing position to press selectively any of said plurality of projections and thereby selectively project said types corresponding thereto in one of a respective first projection direction, wherein printing can be performed on a first recording medium carried by a carrying means detachably mounted to the printer, and a second projection direction, wherein printing can be performed on a second recording medium separate from the printer;

a counter for counting in accordance with the rotation of said base, each count by said counter indicating a type position;

a disc mounted for rotation with said base, said disc including means for generating a first home position signal when said base occupies a first home position thereof and a second home position signal when said base occupies a second home position thereof, said home positions of said base being associated with said respective printing positions of said hammer means;

detection means for detecting said home position signals;

indicating means for providing an indication signal causing said hammer means to assume said first printing position when the carrying means is mounted to the printer and causing said hammer means to assume said second printing position when the carrying means is removed from the printer;

key means for manually providing a selection signal causing said hammer means to assume said second printing position when the carrying means is mounted to the printer; and

control means for controlling said counter to reset the count thereof in response to a home position signal output by said detection means selectively provided in response to the selection signal and indication signal.

4,589,788

MECHANISM FOR RAISING AND TRANSPORTING OF PRINT AND CORRECTION RIBBONS

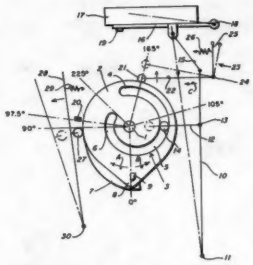
Joseph Lendl, Ottensoos, Fed. Rep. of Germany, assignor to Triumph-Adler, A.G., Nuremberg, Fed. Rep. of Germany

Filed Dec. 5, 1984, Ser. No. 678,357

Claims priority, application Fed. Rep. of Germany, Dec. 9, 1983, 3344595

Int. Cl.[4] B41J *33/14*

U.S. Cl. 400—187 2 Claims



1. In an electronically controlled typewriter having print and correction ribbons and motor driven mechanism for raising and transporting said print and correction ribbons in response to print and correction commands respectively, said mechanism comprising

a single cam wheel mounted on a bidirectionally motor driven shaft rotatable in response to a print command for rotation from an initial position in a first direction to a first predetermined angle, thereafter to a second predetermined angle, and thereafter either back to said intial position, if a subsequent print command does not follow within a predetermined time interval, or back and forth between said first and second predetermined angle in response to subsequent print commands which follow within a predetermined time interval,

said cam wheel having first and second can surfaces,

a first cam follower mounted to be driven by said first cam surface and connected to raise said print ribbon, and

a second cam follower mounted to be driven by said second cam surface and connected to effect transport of said print ribbon,

said first and second cam surfaces being disposed and configured to drive said first cam follower during rotation of said cam wheel to said first predetermined angle and, after printing, to drive said second cam follower during rotation of said cam wheel to said second predetermined angle and thereafter, back and forth during rotation of said cam wheel between said first and second predetermined angle in response to subsequent print commands which follow within a predetermined time interval, whereby said print ribbon will remain raised and only ribbon transport steps will be effected by said second cam follower,

said second cam surface having a symetrical configuration with its maximum lift substantially midway between said first and second predetermined angles, and

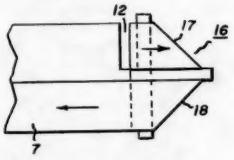
said first and second predetermined angles being established according to the type of print ribbon selected for use to control the length of the ribbon transport steps.

4,589,789

RIBBON STORAGE AND TRANSPORT MECHANISM

Harry C. Quick, Waynesboro, and John M. Read, Charlottesville, both of Va., assignors to Genicom Corp., Waynesboro, Va.

Filed Sep. 26, 1983, Ser. No. 535,618
Int. Cl.[4] B41J *32/02*
U.S. Cl. 400—195 5 Claims



1. In combination, a shuttle printer comprising:
a shuttling dot matrix print mechanism aligned for shuttling action along a line of print, and
a ribbon cartridge comprising
(a) a ribbon storage box portion lying in a first plane,
(b) a first arm lying in said first plane and protruding from said box,
(c) a second arm lying in a second plane displaced perpendicularly from said first plane but parallel thereto,
(d) said first and second arms protruding from said storage box portion,
(e) an endless ribbon,
(f) means for moving said ribbon from a remote end of said second arm through open space diagonally across said line of print to said first arm,
(g) means located in a first portion of said cartridge for pulling said ribbon from said first arm and stuffing said ribbon in a randomly compressed manner in said storage box portion of said cartridge,
(h) a ribbon exit passageway connecting said storage box portion of said cartridge to said second arm,
(i) a ribbon entrance passageway connecting said storage box portion of said cartridge to said first arm,
(j) a dam structure being located adjacent said exit passageway for restraining ribbon movement before permitting it to reach said ribbon exit passageway, and
(k) a converter means positioned between said ribbon exit passageway and said second arm for simultaneously (1) reversing the ribbon face and (2) translating the ribbon from said first plane in said cartridge to said second plane in said second arm whereby said ribbon moves within said arms along mutually parallel paths.

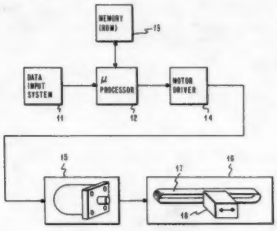
4,589,790

METHOD AND APPARATUS FOR CONTROLLING ESCAPEMENT

John S. Corbin, Jr.; Darryl R. Polk, and Ciro N. Ramirez, all of Austin, Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed May 29, 1984, Ser. No. 614,628
Int. Cl.[4] B41J *19/50*
U.S. Cl. 400—322 16 Claims

1. A system for controlling escapement of a print carrier, comprising:
means for converting escapement data into a plurality of sequential velocity commands, the duration of which are dependent upon the damped natural frequency of the system;
means for driving said print carrier in response to the application of said plurality of sequential velocity commands thereto over the entire length of escapement distance, thereby substantially eliminating velocity and positional error of said print carrier at the conclusion of the last of said plurality of sequential velocity commands; and
wherein said plurality of sequential velocity commands comprises an acceleration velocity command, a deceleration velocity command and a slew velocity command interposed therebetween, the durations of the acceleration



velocity command and the deceleration velocity command being substantially equal to one half of the damped natural period of the system.

4,589,791

DEVICE HAVING SYNTHETIC BRISTLES BUTT WELDED TO SUPPORT PLATE

Georg Weihrauch, Wald-Michelbach, Fed. Rep. of Germany, assignor to Coronet-Werke Heinrich Schlerf GmbH, Fed. Rep. of Germany

Filed Nov. 21, 1983, Ser. No. 554,081
Claims priority, application Fed. Rep. of Germany, Nov. 19, 1982, 3242757
Int. Cl.[4] A46B *11/00, 3/00*
U.S. Cl. 401—290 14 Claims

1. A device for applying a liquid agent, the device comprising a plurality of bundles of synthetic bristles, a thin-walled plastic supporting base forming a part of container accommodating said liquid agent, said plastic supporting base having the bristles of the respective bundles of bristles butt-welded thereto, a plurality of openings provided in said plastic supporting base for supplying the agent to the bristles, the bristles of the respective bundles closely adjoining one another and completely surrounding at least one of said openings in the supporting base and forming a duct that tapers in a direction toward the free ends of the bristles for guiding said liquid agent to the free ends thereof opposite the supporting base.

4,589,792

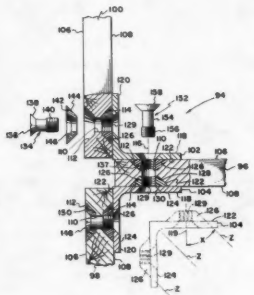
KNOCK-DOWN FURNITURE CONSTRUCTION, CORNER BRACKET AND METHOD

Chester Niziol, 92 Church St. South, Suite 108, Pickering, Ontario, Canada (L1V 2S6)

Continuation-in-part of Ser. No. 173,115, Jul. 28, 1980, Pat. No. 4,421,366. This application Feb. 14, 1983, Ser. No. 465,929

Int. Cl.[4] B25G *3/00*; F16B *12/00*

U.S. Cl. 403—11 **29 Claims**



4. A corner connector bracket for detachably coupling a plurality of angularly related furniture panel members in a predetermined angular relationship but with adjacent border edge portions of adjacent panels being in spaced apart relation that provides gaps between adjacent edges of adjacent panels comprising:

a plurality of angularly related integrally connected flange members, each having inner and outer surfaces;

each of said flange members including a projection extending outwardly from said outer surface of said flange member;

said projections each including an annular sidewall and a receiving bore therethrough, having an axis inclined to the plane of said respective flange member;

said sidewall having a continuous annular outer surface means, which converges radially inwardly in an axially outward direction, for allowing said projections to be located in and dislocated from complementary recesses provided in said panel members without movement of said panel members, with said panel members disposed in a predetermined angular relationship relative to one another.

4,589,793

MOUNTING ARRANGEMENT

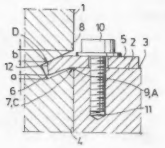
Erik W. Nilsson, Asbovägen 1; Ake Brunnegard, Furuvägen 10, and Hans Ring, Furuvägen 14, all of S-513 00 Fristad, Sweden

Filed May 29, 1984, Ser. No. 614,663

Claims priority, application Austria, Jun. 9, 1983, 2105/83

Int. Cl.[4] B25G *3/28*; F16B *3/04*

U.S. Cl. 403—13 **12 Claims**



1. An arrangement for securely mounting a body in a bore carried by a platen, the platen including a planar surface extending outwardly about the bore, and the body having a peripheral groove, the arrangement comprising:

a mounting plate having a first portion inserted in said groove and a second portion extending outwardly from said groove and overlying said planar surface, said second portion including an aperture, and

means, extending through said aperture and into engagement with said planar surface, for urging said second portion into abutment with said planar surface,

said planar surface and the surface of said mounting plate opposing said planar surface forming an acute angle therebetween so that upon urging said second portion into abutment with said planar surface, said first portion is tensioned within said groove.

4,589,794

SECURING UNIT

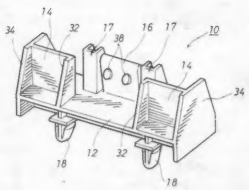
Haruyuki Sugiura, Kariya; Yoshitoki Hayashi, Aichi, and Kazuhiro Matsui, Toyoake, all of Japan, assignors to Kitagawa Industries Co., Ltd., Nagoya, Japan

Filed Apr. 18, 1984, Ser. No. 601,578

Claims priority, application Japan, Jun. 28, 1983, 58-99855[U]

Int. Cl.[4] F16B *7/04*

U.S. Cl. 403—187 **8 Claims**



1. A securing unit for mounting a base plate containing at least one mounting hole at least substantially perpendicularly to a chassis, said securing unit comprising:

(a) a bottom plate which, in use, is at least substantially parallel to the chassis, said bottom plate having a first surface and a second surface, said second surface being at least substantially parallel to said first surface;

(b) at least one detent member extending from the first surface of said bottom plate, said at least one detent member being sized, shaped, and positioned to engage the securing unit to the chassis;

(c) a pair of spaced first walls extending at least approximately vertically from the second surface of said bottom plate, each of said pair of spaced first walls having a first side surface, a second side surface, a back surface, and a base plate-engaging surface for supporting a first side surface of a base plate during use of the securing unit, the base plate-engaging surface of each of said pair of spaced first walls extending from the second surface of said bottom plate to the top of said first wall, the base plate-engaging surfaces of said first walls being co-planar and the first side surface of one of said pair of spaced first walls facing the first side surface of the other one of said pair of spaced first walls and being separated therefrom by a gap extending from said second surface of said bottom plate to the top of each of said pair of spaced first walls and from the back surface to the base plate-engaging surface of each of said pair of spaced first walls;

(d) a pair of spaced second walls extending at least approximately vertically from the second surface of said bottom plate, each of said pair of spaced second walls having a first side surface, a second side surface, a back surface, and a base plate-engaging surface for supporting a second side surface of a base plate during use of the securing unit, the base plate-engaging surface of each of said pair of spaced second walls extending from the second surface of said

bottom plate to the top of said second wall, the base plate-engaging surfaces of said second walls being co-planar and the first side surface of one of said pair of spaced second walls facing the first side surface of the other one of said pair of spaced second walls and being separated therefrom by a gap extending from said second surface of said bottom plate to the top of each of said pair of spaced second walls and from the back surface to the base plate-engaging surface of each of said pair of spaced second walls, the base plate-engaging surfaces of said second walls being at least substantially parallel to and facing the base plate-engaging surfaces of said first walls and being spaced therefrom by a distance which permits the base plate to be received therebetween during use of the securing unit;

(e) a resilient pushing member extending approximately vertically from the second surface of said bottom plate between said pair of spaced second walls, said pushing member having a base plate-engaging surface which is approximately co-planar with the base plate-engaging surfaces of said second walls and which extends from said second surface of said bottom plate to the top of said resilient pushing member, said pushing member being sized, shaped, and positioned so that its base plate-engaging surface bears resiliently against a base plate received between said pair of spaced first walls and said pair of spaced second walls and pushes the base plate toward and into engagement with the base plate-engaging surfaces on said pair of spaced first walls; and

(f) at least one detent projection projecting from the base plate-engaging surface of said resilient pushing member, said at least one detent projection being sized, shaped, and positioned to be releasably received in a corresponding mounting hole in the base plate during use of the securing unit.

4,589,795

BEAM COUPLING

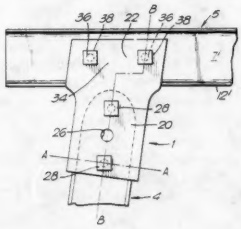
Colin J. MacLeod, Newark, England, assignor to Caledonian Mining Company Ltd., England

Filed Jan. 16, 1985, Ser. No. 692,358

Claims priority, application United Kingdom, Jan. 17, 1984, 8401175

Int. Cl.⁴ B25G *3/00*; F16B *7/08*

U.S. Cl. 403—233 **5 Claims**



1. A beam coupling comprising a pair of plates shaped to connect a first 'I' or channel beam with a second 'I' or channel beam, at least one plate comprising

a first beam wrapping portion adapted to seat on opposed flanges on one side of said first beam, said first portion comprising a central part formed to fit between said opposed flanges of said first beam so as to lie substantially parallel to the central web of said first beam, said first portion further comprising opposed wing parts that extend laterally on each side of said central part so that in use said wing parts wrap around and are snugged against the opposed minor edges of said opposed flanges on said one side of said first beam, and said first portion having a hole in said central part to receive a fastener passing through said first beam's central web for connecting said one plate with said first beam and the other of said pair of plates, and

a second beam wrapping portion adapted to seat on one flange of said second beam, said second portion comprising a lip which in use wraps around and is snugged against one minor edge of one flange of said second beam when said second beam is connected at an angle to said first beam.

4,589,796

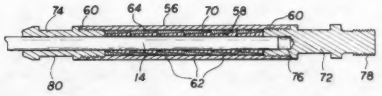
GLASS FIBER SUCKER ROD SYSTEM

Robert P. Newling, Jackson, Mich., assignor to Plastigage Corporation, Jackson, Mich.

Division of Ser. No. 476,784, Mar. 18, 1983. This application Mar. 8, 1985, Ser. No. 709,764

Int. Cl.⁴ B25G *3/34*; F16B *11/00*

U.S. Cl. 403—266 **2 Claims**



1. A high tension end fitting for a glass fiber sucker rod comprising, in combination, a tubular casing having an inner cylindrical surface and ends, a plurality of inserts within said casing each having a continuous uninterrupted outer cylindrical surface of slightly less diameter than the diameter of said casing inner surface, first and second ends and a conical axial bore converging in the axial direction from said first end to said second end, the maximum diameter of said bore intersecting said first end and the minimum diameter of said bore intersecting said second end, the minimum diameter of said bore at said second end being greater than the rod diameter, said inserts being located in end-to-end relationship within said casing, said first end of one insert engaging said second end of the adjacent insert, said inserts defining a recess within said casing consisting of a plurality of conical segments, a glass fiber rod end received within said recess, a hardened resin within said recess and conical segments bonded to said rod, bond release means interposed between said inserts' bores and said resin preventing bonding of said resin to said inserts, said resin having an outer surface corresponding in configuration to the shape of said inserts' bores and axially displaceable relative to said inserts, said inserts' second ends being disposed in the axial direction of tension forces imposed on the glass fiber rod whereby rod tension forces tend to displace said rod end in the direction of said inserts' second ends causing said resin to be compressed upon said rod end by inserts' conincal bores, internal threads defined upon said casing at each end thereof, an adapter threaded upon each casing end defining rod connection means, said adapters each including an exteriorly threaded end engaging said casing's internal threads and an inner end engaging the end of the adjacent insert whereby said adapters axially position and retain said inserts within said casing.

4,589,797

FIXING MEMBER ADAPTED TO BE CLAMPED ON A SHAFTLIKE ELEMENT

Boerge Martins, Vom Bergeweg 1A, D-2000 Hamburg, Fed. Rep. of Germany

PCT No. PCT/DK80/00069, § 371 Date Mar. 24, 1982, § 102(e) Date Mar. 24, 1982, PCT Pub. No. WO82/00325, PCT Pub. Date Feb. 4, 1982

PCT Filed Nov. 12, 1980, Ser. No. 364,849

Claims priority, application Denmark, Jul. 24, 1980, 3185/80

Int. Cl.⁴ F16B *2/00, 7/04*

U.S. Cl. 403—372 **11 Claims**

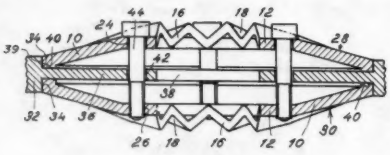
1. A fixing member having an axial opening and being

adapted to be clamped onto a shaft-like element passing through said opening by deforming said fixing member upon application of axially acting clamping means, comprising

an outer truncated and normally generally conical portion converging in a direction towards said opening, said outer truncated portion including an outer rim having a surface adapted to contact and axially to be supported by a counter member,

an inner accordion-like portion integral with said outer portion, said inner portion terminating in an inner rim at said axial opening,

said inner portion including radially outward extending



folds, and substantially flat portions between said folds, at least some of said flat portions being adapted to be influenced by said clamping means for being axially urged in the direction of said counter member,

said inner rim having a wave-shaped countour as viewed radially outwardly and being adapted to receive said shaft-like element,

whereby upon appliction of axial pressure to said fixing member by means of said clamping means, said fixing means is in some degree flattened and said folds in some degree compressed and thereby said fixing member deformed so that said inner rim frictionally engages said shaft-like element.

4,589,798

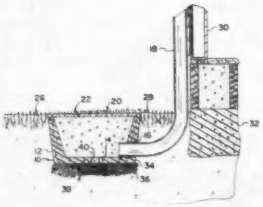
DRAINAGE SYSTEM

John J. Milly, 2425 Island View Dr., Panama City, Fla. 32405

Filed Jun. 4, 1984, Ser. No. 616,673

Int. Cl.[4] B01D *21/10*; E02B *13/00*

U.S. Cl. 405—36 **9 Claims**



1. A drainage system, including an enclosure, and comprising:

a generally horizontal base of said enclosure having an opening therein, which opening has an area small with respect to the balance of the area of said base;

wall regions of said enclosure extending around and upward from said base to a generally flat upper edge and having a side entrance opening;

a body of water-permeable material beneath said base;

a generally flat cover member configured to be laterally and vertically supported on said upper edge of said wall regions and partially covering, from 20% to 60%, the inner top dimension of said enclosure;

a drain pipe extending downward and having a generally L-shaped region curving downward from a generally vertical posture through a generally horizontal one, and said end being adapted to extend into said entrance opening in said wall regions;

whereby water passing down through said drain pipe generally fills said enclosure and thereafter flows upward and then outward from said enclosure and is dispersed around said enclosure, and finally, residual water filling said enclosure passes down through said opening in said base and is dissipated.

4,589,799

DEVICE FOR LOCKING PLATFORM OF OFFSHORE STRUCTURE

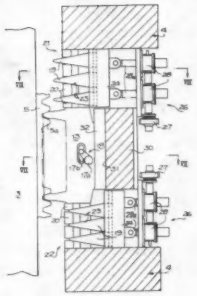
Minoru Hotta, Yokohama; Okitada Hara, Tokyo, and Toshimitsu Araki, Musashino, all of Japan, assignors to Ishikawajima-Harima Jukogyo Kabushiki Kaisha and The Shipbuilding Research Association, both of Tokyo, Japan

Filed Oct. 11, 1983, Ser. No. 540,554

Claims priority, application Japan, Oct. 26, 1982, 57-186733

Int. Cl.[4] E02B *17/06*

U.S. Cl. 405—196 **2 Claims**



1. In an offshore structure having a plurality of legs to be erected substantially upright on a sea floor or the like, a plurality of racks respectively extending longitudinally of said plurality of legs and each having a plurality of first teeth, and a platform movable vertically relative to said plurality of legs: a device for locking said platform relative to said legs, said device comprising: a plurality of chocks each having a plurality of second teeth, each second tooth having an addendum remote from said chock for meshing engagement with the respective first tooth and a dedendum at said chock and free of the respective first tooth, the depth of each second tooth being greater than about 1.5 times the depth of each first tooth, whereby upon engagement of said first and second teeth the dedendums are deflected upon the addendums so as to follow displacement of said platform in the direction of gravity.

4,589,800

DOCK STRUCTURE AND METHOD AND APPARATUS FOR RAISING AND LOWERING SAME

Charles L. Nasby, Jr., 4624 Bruce Ave. South, Minneapolis, Minn. 55424

Filed Mar. 29, 1985, Ser. No. 717,386

Int. Cl.[4] E02B *3/20*

U.S. Cl. 405—221 **10 Claims**

1. A dock structure comprising:

(a) a deck structure;

(b) support means for supporting the deck structure, the support means including first and second elongated upright support members positioned proximate opposite sides of the deck structure;

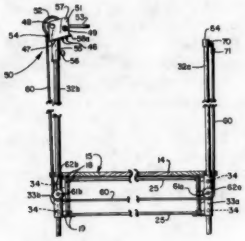
(c) sleeve means interconnected to the deck structure and slidably mounted on the first and second elongated upright support members for providing vertical movement

of the deck structure relative to the first and second elongated upright support members, the sleeve means including releasable means for securing as desired the sleeve means against slidable movement along the first and second elongated upright support members;

(d) a winch mounted on the first elongated upright support member at a location above the deck structure;

(e) cable guide means interconnected to the deck structure for guiding cable therethrough;

(f) a cable attached at a first end to the winch; and



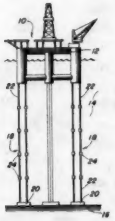
(g) means for interconnecting the cable at its second end to the second elongated upright support member at a location above the deck structure, the cable extending transversely of the deck structure from the first elongated upright support member to the second elongated upright support member through the cable guide means such that upon operation of the winch to shorten the cable, the deck structure will be elevated relative to the first and second elongated upright support members, and upon operation of the winch to lengthen the cable, the deck structure will be lowered relative to the first and second elongated upright support members.

4,589,801

COMPOSITE MOORING ELEMENT FOR DEEP WATER OFFSHORE STRUCTURES

Mamdouh M. Salama, Ponca City, Okla., assignor to Conoco Inc., Ponca City, Okla.

Filed Jul. 16, 1984, Ser. No. 631,127
Int. Cl.⁴ E02B *17/00*
U.S. Cl. 405—224 **14 Claims**



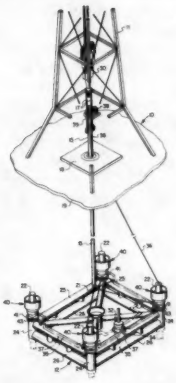
1. In a floating tension leg platform wherein a plurality of substantially vertically oriented, tensioned axially mooring elements are connected so as to be constantly in tension between anchoring means located on a sea bottom and said floating platform, the improvement which comprises said mooring elements axially tensioned being a composite structure of a plurality of longitudinally oriented carbon fibers imbeded in a resin matrix.

4,589,802

SLIP ASSEMBLY FOR SUBSEA TEMPLATE

James E. Hampton, Peterculter, Scotland, assignor to Sedco, Inc., Dallas, Tex.

Continuation-in-part of Ser. No. 292,014, Aug. 11, 1981, Pat. No. 4,435,108. This application Dec. 21, 1982, Ser. No. 450,991
Int. Cl.⁴ E02B *17/02*
U.S. Cl. 405—227 **15 Claims**



1. A slip assembly for interconnecting a subsea template or the like to a support pile, said slip assembly comprising:

a frame including means defining a receptacle for receiving a pile extending longitudinally through said frame, said frame including means for supporting said slip assembly on said template;

a slip bowl comprising a member having a conical surface forming a receptacle for receiving a plurality of slip segments, said slip bowl member being loosely journalled on said frame for limited radial movement to substantially align the central axis of said conical surface with the central axis of a pile disposed through said slip assembly;

a plurality of slip segments having outward facing conical surfaces for engagement with said slip bowl to force said segments into gripping engagement with said pile; and

fluid operated cylinder and piston actuator means operably connected to said segments by means for moving said segments axially to engage said slip bowl whereby said segments are moved radially into gripping engagement with said pile.

4,589,803

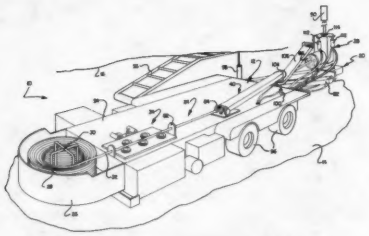
METHOD AND APPARATUS FOR INSTALLING MINE ROOF SUPPORTS

Arthur B. Totten, III, 390 Darbys Run, Bay Village, Ohio 44140

Filed Jan. 9, 1984, Ser. No. 569,050
Int. Cl.⁴ E21D *20/00, 21/00*
U.S. Cl. 405—259 **7 Claims**

1. A method of installing mine roof support plates at a plurality of locations in a mine, said method comprising the steps of drilling a first hole in a mine roof at a first location in the mine, moving a coil of rod material to the first location in the mine, feeding rod material from the coil of rod material while the coil is at the first location in the mine, straightening the rod material fed from the coil, connecting a first expandable anchor assembly to an end of the rod material, inserting the first anchor assembly into the first hole, said step of inserting the first anchor assembly into the first hole including feeding rod material upwardly through a first fastener and a first mine roof support plate into the first hole, setting the first anchor assembly in the mine roof by pulling downwardly on the rod material with a first force to expand the first anchor assembly after having inserted the first anchor assembly into the first hole,

thereafter, pulling downwardly on the rod material with a second force which is less than the first force, pressing the first mine roof support plate against the mine roof at the first location, connecting the first fastener with the rod material while pressing the first mine roof support plate against the mine roof and while pulling downwardly on the rod material with the second force to enable to fastener to cooperate with the rod material to press the first mine roof support plate against the roof of the mine at the first location with a force having a magnitude which is a function of the magnitude of the second force, thereafter, cutting the rod material to separate the coil of rod material from the rod material in the first hole, drilling a second hole in the roof of the mine at a second location in the mine, moving the coil of rod material from the first location to the second location in the mine, connecting a second expandable anchor assembly to an end of the rod material formed as a result of having performed said step of cutting the rod material, inserting the second anchor assembly into the second hole, said step of inserting the second anchor assembly into the second hole including feeding rod material upwardly through



a second fastener and a second mine roof support plate into the second hole, setting the second anchor assembly in the mine roof by pulling downwardly on the rod material with a force of a magnitude which is substantially the same as the magnitude of the first force to expand the second anchor assembly after having inserted the second anchor assembly into the second hole, thereafter, pulling downwardly on the rod material with a force which is of substantially the same magnitude as the second force, pressing the second mine roof support plate against the mine roof at the second location, connecting the second fastener with the rod material while pressing the second mine roof support plate against the mine roof and while pulling downwardly on the rod material with a force of a magnitude which is substantially the same as the magnitude of the second force to enable the second fastener to cooperate with the rod material to hold the second mine roof support plate against the roof of the mine at the second location with a force which is a function of the magnitude of the second force, and, thereafter, cutting the rod material to separate the coil of rod material from the rod material in the second hole.

4,589,804

METHOD FOR WATERPROOFING SURFACES

Arnis U. Paeglis, Woodbury, and Ebon P. Weaver, Naugatuck, both of Conn., assignors to Uniroyal Chemical Company, Inc., Middlebury, Conn.

Filed Mar. 28, 1983, Ser. No. 479,377
Int. Cl.[4] C09K *17/00*
U.S. Cl. 405—270 **30 Claims**

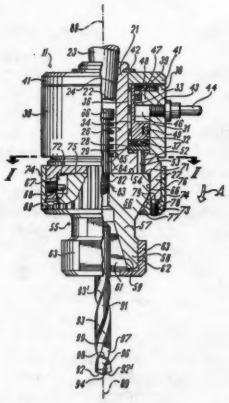
1. A method of waterproofing a surface comprising:
(a) forming a first sheet of an elastomeric composition comprising:
a neutralized acid group containing elastomeric polymer, said neutralized acid group containing a cation selected from the group consisting of ammonium, antimony, aluminum, iron, lead and a metal of Group IA, IIA, IB or IIB of the Periodic Table of Elements and mixtures thereof;
a non-polar process oil;
carbon black; and
a preferential plasticizer;
(b) forming a second sheet of said elastomeric composition which may be the same or different from said first sheet;
(c) disposing said sheets upon said surface; and
(d) heat sealing at least one edge of said first sheet to at least one edge of said second sheet.

4,589,805

BORING AND DEBURRING HEAD AND BORING AND DEBURRING TOOL CAPABLE OF BEING FASTENED THEREIN, AND METHOD FOR BORING AND DEBURRING A WORKPIECE

August Duffner, Schonach, Fed. Rep. of Germany, assignor to Kadia-Diamant Maschinen- und Werkzeugfabrik O. Kopp GmbH & Co., Fed. Rep. of Germany

PCT No. PCT/EP83/00237, § 371 Date May 15, 1984, § 102(e) Date May 15, 1984, PCT Pub. No. WO84/01117, PCT Pub. Date Mar. 29, 1984
PCT Filed Sep. 10, 1983, Ser. No. 614,163
Int. Cl.[4] B23B *51/10, 31/04*
U.S. Cl. 408—21 **5 Claims**



1. A boring and deburring head for fastening a boring and deburring tool, comprising:
a drive element that can be coupled with a rotationally driven bore spindle or the like, said drive element defining a longitudinal axis of rotation and including a cup-shaped area defining an inner cylindrical face;
a clamping device for clamping a boring and deburring tool, said clamping device defining a longitudinal axis of rotation, and being connected to the drive element to be pivotable relative thereto and such that relative rotation between the drive element and the clamping element is prevented, said clamping device including a clamping cone having a rear area defining a spherical circumferential face which is inserted, without substantial radial play, into the cup-shaped area of the drive element and in engagement with the inner cylindrical face of the cup-shaped area, as a result of which shifting of the clamping device relative to the drive element with respect to an initial position of the clamping device is permitted such that the axis of rotation of the clamping device is shifted relative to the axis of rotation of the drive element;
shifting means connected to the clamping device for effecting shifting of the clamping device from its initial position to a shifted position; and
restoring means connected to the clamping device for re-

turning the clamping device to its initial position from its shifted position.

4,589,806

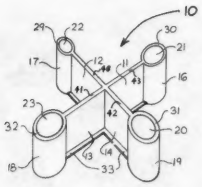
TAP AND DRILL GUIDE

James W. Rotta, Jr., 6627 Scarbrough Rd., Anderson, Calif. 96007

Continuation of Ser. No. 503,903, Jun. 13, 1983, abandoned. This application Mar. 12, 1985, Ser. No. 710,854

Int. Cl.[4] B23B *49/02*

U.S. Cl. 408—72 R **1 Claim**



1. A guide for use in drilling and tapping holes, comprising:

four guide means, each consisting of a substantially cylindrical lobe having:

a height and an outer diameter which is substantially perpendicular to said height;

a hole therein positioned substantially concentrically with respect to said outer diameter of said lobe, said hole being of a diameter useful in guiding a tap, and

a wall defined by said outer diameter of said substantially cylindrical lobe and said diameter of said hole, said wall being of a sufficient thickness to ensure structural integrity of said guide means during use of said guide, and

a body having a center and four arms attached to one another at said center of said body, said arms extending outward from an axis defined by said center of said body and positioned at substantially 90-degree intervals about said axis, each of said arms having a height and a thickness, said thickness being of a lesser dimension than said height and also of a lesser dimension than said outer diameter of the smallest of said guide means, each of said arms further having an outer end attached to one of said four guide means and oriented so that said height of said arm to which said guide means is attached is substantially perpendicular to said diameter of said hole in said guide means and so that said thickness of said arm to which said guide means is attached is substantially perpendicular to said height of said guide means.

4,589,807

HOLE PRODUCTION TOOL

Louis G. Martin, 12139 N. Linden Rd., Clio, Mich. 48420

Filed Nov. 25, 1983, Ser. No. 555,288

Int. Cl.[4] B23B *51/04*

U.S. Cl. 408—205 **2 Claims**

1. Drill apparatus for cutting a circular hole in a workpiece to form a core and removing the core from the hole thus formed, comprising:

a rotatable hollow elongate drill shank having an annular cutting edge, of a predetermined diamter, at the axially outer end thereof for cutting a circular hole in said workpiece;

drive means, detachably coupled to the axially inner end of said drill shank, for rotating said drill shank about its longitudinal axis and for relatively moving said drill shank and said workpiece toward and away from each other;

said drill shank including a hollow cylindrical tubular member including

an inlet opening at the axially outer end thereof;

an axially inner discharge opening, and

an elongate axially extending passage for communicating drilled material from said inlet opening to said discharge opening;

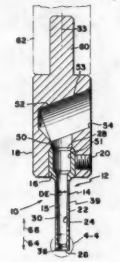
a hollow cylindrical, axially outer, material-compressing terminal portion for receiving and radially compressing material cut by said cutting edge to form a compressed core of plastically strained material, which has an outside diameter substantially less than said predetermined diameter of said annular cutting edge;

said terminal portion being provided with opposed, axially extending inner and outer cylindrical surface portions which radially converge in an axially outward direction to form said annular, terminal material-cutting edge, of said predetermined diameter;

a hollow cylindrical throttle portion, axially inwardly adjacent said compressing portion, of a predetermined radial thickness and predetermined axial length, defining a material-receiving throat having a predetermined lesser diameter, for receiving and axially passing the radially compressed core from said compressing portion;

a hollow cylindrical discharge portion, axially inwardly adjacent said throttle portion, defining an axially extending material-receiving discharge passage of a diameter which is greater than the diameter of said throat but less than the diameter of said cutting edge to allow the compressed material to partially radially expand and freely axially pass axially inwardly of said throat;

said drive means including an axially extending internal passage in communication with the axially inner end of said



passage in said tubular member for receiving and axially passing said core material, and a transversely extending discharge passage for receiving said core from the axial passage in said drive means and passing it radially outwardly;

said predetermined axial length being substantially less than said predetermined lesser diameter;

said tubular member including an outer, right circular, cylindrical surface concentric about said longitudinal axis; said inner cylindrical surface of said compressing portion diverging radially outwardly in an axially outward direction;

said hollow cylindrical discharge portion including a cylindrical sidewall portion having a radial thickness less than the radial thickness of said throttle portion;

said cylindrical surface portion of said hollow cylindrical discharge portion diverging radially outwardly in an axially inward direction at a rate of at least 0.001 inches per axial inch; the ratio of said predetermined diameter of said annular cutting edge, less the diameter of said throat relative to said predetermined diameter of said annular cutting edge, lies within the range of 0.25 to 0.36, and the ratio of said predetermined diameter, less the diameter of said throat, relative to said predetermined diameter less the diameter of said discharge passage lies within a range of 1.45 to 6.0; and the included angle between said inner and outer cylindrical surface portions which converge to form said cutting edge lies within a range of 30° to 45°;

said axially inner end of said drill shank and said drive means including complimentally threaded portions in threaded

engagement, said drive means and said drill shank including complimentally tapered mating seating surfaces in bearing seating engagement.

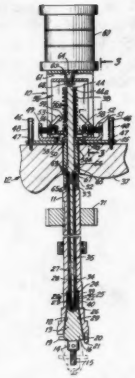
said tubular member including an additional inner surface portion which diverges radially outwardly in an axially inner direction from the axially inner end of said right circular cylindrical portion.

4,589,808

POWER DRAW BAR

Charles A. O'Connor, E. Norwich, N.Y., assignor to Lesnor Maehr Manufacturing Corp., Farmingdale, N.Y.

Filed Nov. 16, 1984, Ser. No. 671,924
Int. Cl.[4] B23C *5/26*; B23B *31/10*
U.S. Cl. 409—233 **11 Claims**



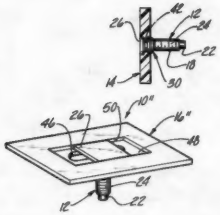
1. A power draw bar for releasably securing a tool holder within the spindle of a metal cutting machine, said tool holder having a tool receiving chuck at one end and an internally bored and threaded tapered shank at the other end comprising a rigid frame for attachment to the housing of a metal cutting machine, an axially bored elongated spindle rotatably supported within the rigid frame, said spindle being movable along its longitudinal axis in a path normal to said frame, a tapered tool holder receiving recess at one end of the spindle, an elongated axially bored draw bar slidably carried within the spindle bore, an externally threaded tapered portion on said draw bar disposed within the tool holder receiving recess of the spindle, slots in the said draw bar tapered portion defining spaced arms therein, an elongated rod-shaped draw bar expander carried within the draw bar bore and extending beyond each end thereof, a tapered button on the end of the draw bar expander disposed in the path of the tool holder, a complementary tapered portion in the draw bar bore adapted to receive the tapered button, a spring carried by the draw bar expander adjacent the end opposite the tapered button, a spring biasing member on the said expander, said spring being located between the end of the spindle and the spring biasing member, a power source carried by the rigid frame, a driven piston rod in said power source operably engagable with the draw bar expander to longitudinally move said expander in a first direction for tool holder ejection and also release the said expander for movement by the spring in an opposite direction for tool holder engagement with the spindle, and means carried by the rigid frame to limit the travel of the spindle in the direction of the tool holder during tool ejection.

4,589,809

STUD FASTENER

Richard B. Moore, 1285 Balmoral, Mt. Clemens, Mich. 48043, and Kenneth R. McClintock, 15944 Chelmsford, Mt. Clemens, Mich. 48044

Filed Sep. 2, 1983, Ser. No. 529,158
Int. Cl.[4] F16B *39/00*
U.S. Cl. 411—166 **22 Claims**



1. A fastener comprising a plastic member having a stud receiving hole therethrough formed without engaging the stud and a non-circular recess therein overlapping said hole, said recess being wider than said hole, a metal stud removably receivable in said hole, said stud having a shank with a portion axially insertable through said hole with a maximum transverse dimension no greater than the minimum transverse dimension of said hole, an enlargement on said shank projecting outwardly generally transversely thereof and having a maximum transverse dimension greater than the minimum transverse dimension of said hole, said enlargement being constructed and arranged to bear on said plastic member to limit the extent to which said stud can be inserted through said hole in one direction, and having a non-circular configuration at least in part receivable in said recess in said plastic member and having at least one portion engagable with a complementary portion of said recess to prevent rotation of said stud with respect to said plastic member when said stud is received therein, and an enlarged ring on said shank extending outwardly generally transversely thereof with a maximum transverse dimension greater than that of said shank and less than that of said enlargement, being separate from and axially spaced from said enlargement, and constructed and arranged to form a circumferentially continuous groove therebetween into which a portion of the plastic member surrounding said hole extends when said stud is inserted into said hole with said portion of said plastic member received between said enlargement and said ring, said ring and said hole being dimensioned and constructed and arranged such they have an interference fit wherein said maximum transverse dimension of said ring is greater than the minimum transverse dimension of said hole, and said ring having a side adjacent said enlargement which is generally flat, circumferentially continuous, and inclined to the axis of said shank at an acute included angle in the range of about 10° and 75°, whereby said stud is releasably retained in said plastic member and prevented from rotating with respect to said plastic member when a portion of the plastic member surrounding said hole is received in said groove and disposed between said enlargement and said ring.

4,589,810
DEVICE FOR PROGRAMMING MOVEMENTS OF A ROBOT

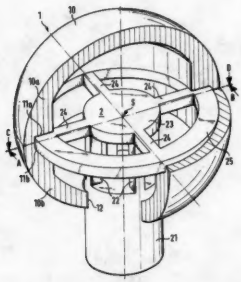
Johann Heindl, and Gerhard Hirzinger, both of Seefeld, Fed. Rep. of Germany, assignors to Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V., Cologne, Fed. Rep. of Germany

Filed Oct. 26, 1983, Ser. No. 545,737

Claims priority, application Fed. Rep. of Germany, Oct. 30, 1982, 3240251

Int. Cl.⁴ B25J *3/00*

U.S. Cl. 414—5 **1 Claim**



1. In a device for programming motions, forces, and torques of an articulated robot having an end link provided with an actuator, including driving means for imparting translational and rotary movements to the end link, and control means for applying control commands to the driving means to move the last link according to a system of coordinates, the improvement comprising a hand grip sensor unit assembled of a force momentum sensor having a deformable measuring part and a rigid base part, and a hollow spherically configured body formed of a rigid plastic material with an opening therein for the base part of the sensor and an inner surface portion rigidly connected to the measuring part of the sensor, said spherical body being assembled of two rigidly connected hemispheres, said opening being formed in one hemisphere defining a center axis normal to the separation plane of the two hemispheres, an annular groove formed in the inner surface portion extending in the separation plane of the two hemispheres and the measuring part of the sensor having a ring shaped portion which fits snugly into said annular groove, and the measuring part of said sensor includes a load pick-up plate connected to said ring by uniformly distributed spokes and further being connected to said base part of the sensor by straight supports which are directed at right angles to said spokes so that the measuring center point of the entire hand grip-sensor unit is located in the center point of the spherical hollow body and in the separation plane of the two hemispheres.

4,589,811
DEVICE FOR AUTOMATICALLY SUPPLYING REELS OF WRAPPING MATERIAL TO A UTILIZER MACHINE

Mattei Riccardo, Bologna, and Bruno Belvederi, S. Martino di Monte S. Pietro, both of Italy, assignors to G.D. Societa per Azioni, Bologna, Italy

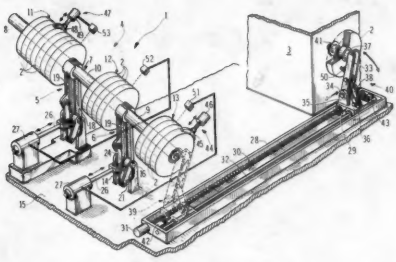
Filed Dec. 18, 1984, Ser. No. 683,266

Claims priority, application Italy, Jan. 25, 1984, 3320 A/84

Int. Cl.⁴ B65H *1/00*

U.S. Cl. 414—224 **4 Claims**

1. A device for automatically supplying reels of wrapping material to an utiliser machine comprising: a magazine for a plurality of reels comprising tubular winding spindles and constituting a reserve stock disposed in a position adjacent to said machine; transfer means for transferring said reels in succession from said magazine to said machine; a shaft in said magazine for supporting said reals through said tubular spindles and extending from a position in which said reels are loaded on to a first end thereof and a position in which said reels are taken-up from the second end thereof by said transfer means; at least two support elements for said shaft comprising gripper means which can be removed from this latter and



which define along said shaft a plurality of partial magazines; means for causing each of said gripper means to withdraw from and reapproach said shaft; and mutually independent operating means for each of said withdrawal and reapproach means controlled by means for monitoring the state of filling of individual partial magazines.

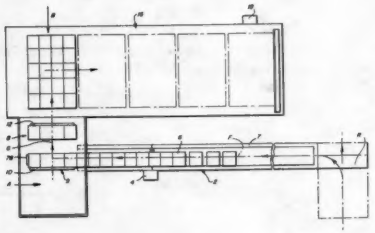
4,589,812
METHOD OF AND APPARATUS FOR STACKING REAMS OF PAPER SHEETS

Otis E. Meives, Cleveland, and James W. Lewandoske, Sheboygan, both of Wis., assignors to Pemco, Inc., Sheboygan, Wis.

Filed Oct. 18, 1983, Ser. No. 543,084

Int. Cl.⁴ B65G *57/10*

U.S. Cl. 414—46 **26 Claims**



2. Apparatus for accumulating piles of sheets into stacks, particularly for accumulating reams of paper sheets into stacks of reams, comprising a source of piles; feed conveyor means for advancing a file of piles from said source at a predetermined level and along a predetermined elongated path; elevator means adjacent to a portion and disposed at one side of said path; means for moving said elevator means between a first position at said level, at least one second position below said level and a third position above said level; means for shifting predetermined numbers of piles from the leader of the file in said path onto said elevator means in a direction transversely of said path first in the first and thereupon in the at least one second position of said elevator means so that the piles which are shifted in the second position of the elevator means come to rest on the piles already on said elevator means and form larger stacks therewith; means for operating said moving means so as to move said elevator means and the larger stacks thereon to said third position after the elevator means reaches said second position and to thereupon move said elevator means to said first position and said at least one second position; and means

for removing larger stacks from said elevator means in the third position of said elevator means.

4,589,813

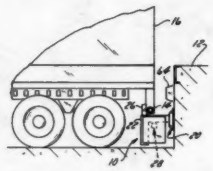
TRUCK RESTRAINING DEVICE

James P. Hagen, W322 N6811 Wildwood Pt. Rd., Hartland, Wis. 53029, and Walter E. Meyer, 3359 Highway "I", Saukville, Wis. 53090

Filed Jun. 7, 1984, Ser. No. 618,069

Int. Cl.[4] B65G *67/02*

U.S. Cl. 414—401 **9 Claims**



1. An apparatus for restricting the movement of a parked vehicle having an "ICC" bar on the rear end thereof from moving away from a loading dock, said apparatus comprising

first means mounted on the front of the loading dock for movement between a first position adjacent to the front of the dock and a second position extending outwardly therefrom a distance sufficient to pass under the "ICC" bar,

second means mounted on the first means for vertical movement with respect to the first means to a blocking position to restrict movement of the "ICC" bar to a predetermined distance from the loading dock, and

drive means for selectively moving said second means to said blocking position.

4,589,814

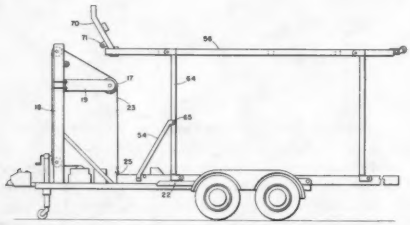
BOAT AND CAR TRAILER

Medwin A. Cates, 1122 N. 14th St., Collinsville, Okla. 74021

Filed Aug. 3, 1984, Ser. No. 637,292

Int. Cl.[4] B60P *3/08, 3/10*

U.S. Cl. 414—484 **8 Claims**



1. A trailer for supporting a primary load and a secondary load comprising:

a main frame supported by wheels;

a primary loading platform supported from said frame and having pivot means near the rear end of said main frame so that said primary loading platform can be rotated from an at rest horizontal position on said frame to a tilted position rearwardly with respect to the trailer;

a secondary loading platform;

a pair of front stanchions and a pair of rear support stanchions each stanchion pivotally connected at its lower end to said primary loading platform and at its upper end to said secondary loading platform;

means to fix said stanchions to prevent rotation.

4,589,815

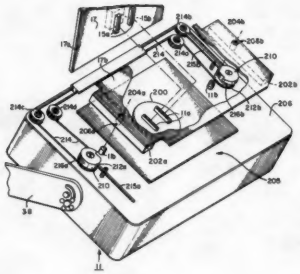
ELECTRONIC TEST HEAD POSITIONER FOR TEST SYSTEMS

Nathan R. Smith, Vincentown, N.J., assignor to InTest Corporation, Cherry Hill, N.J.

Continuation-in-part of Ser. No. 411,311, Aug. 25, 1982, Pat. No. 4,527,942. This application Aug. 11, 1983, Ser. No. 522,635

Int. Cl.[4] B66F *9/18*

U.S. Cl. 414—590 **9 Claims**



1. A system for docking and undocking an electronic test head with respect to an electronic device handler comprising

alignment means including at least two alignment pins and respective socket means for receiving each pin. The pins being secured to the test head and the socket means being secured to the handler,

a camming assembly for pulling together and pushing apart the head and the handler including at least two cams having helical grooves for receiving cam follower pins, and cable means for coupling the cams together so that they turn in synchronism.

4,589,816

ROBOT JOINT

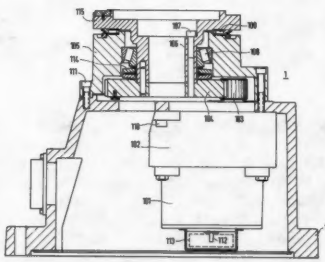
Manfred Eberle, and Robert Kleemann, both of Erlangen, Fed. Rep. of Germany, assignors to Mantec Gesellschaft für Automatisierungs-und Handhabungssysteme mbH, Fürth, Fed. Rep. of Germany

Filed Mar. 27, 1984, Ser. No. 593,853

Claims priority, application Fed. Rep. of Germany, Apr. 6, 1983, 3312404

Int. Cl.[4] B25J *17/00*

U.S. Cl. 414—680 **5 Claims**



1. A robot joint for coupling a first robot part to a second robot part comprising:

drive motor means;

step-down transmission means arranged in tandem with said drive motor means and having an input coupled to said drive motor means and an output;

first tubular member means disposed about said drive motor

means and said transmission means and adapted to be coupled to the first robot part, said first tubular member means forming a housing for said drive motor means;

second tubular member means disposed coaxially about and extending around said first tubular member means;

at least two spaced bearing means disposed on said first tubular member means, said second tubular member means guided coaxially on said first tubular member means by said spaced bearing means, said second tubular member means adapted to be coupled to the second robot part;

said output of said step-down transmission means being mechanically coupled to said second tubular member means by a coupler part, said coupler part comprising a flange of said second tubular member means extending into said first tubular member means; and

screw means for maintaining said first tubular member means disposed about said second tubular means, said first and second tubular member means being axially disassemblable upon loosening said screw means.

4,589,817

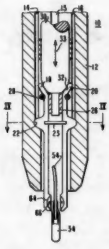
AUTOMATED COMPONENT HANDLING SYSTEM

Philip J. Adinolfi, Columbia, and Arthur B. Redpath, Severna Park, both of Md., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 22, 1984, Ser. No. 582,342

Int. Cl.[4] B25J *15/00*

U.S. Cl. 414—729 **6 Claims**



1. A component holding chuck useable with mechanized assembly apparatus, having:

(a) a plurality of jaw members each having interior and exterior edges supported in a housing such that selected portions of said exterior edges of said jaws contact the interior surface of said housing such that said jaw members are rotatable through a determinable angle thereby causing said jaw members to selectively open and close as said jaw members rotate;

(b) means for applying an outwardly extending force to said interior edges of said jaw members;

(c) resilient means disposed to apply an opening force to said exterior edges of said jaw members; and

(d) means for selectively applying a closing force to said jaw members, such that when said closing force exceeds said opening force said jaws close.

4,589,818

APPARATUS FOR ROTATING AND RECIPROCATING A TRANSFER MEMBER

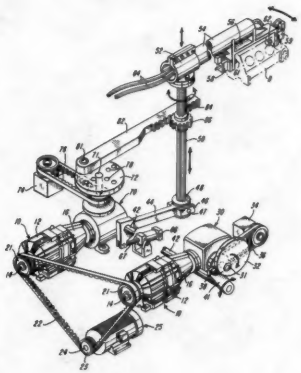
John B. Brown, Clarkston, and Reginald D. Kelley, Troy, both of Mich., assignors to Force Control Industries, Inc., Fairfield, Ohio

Continuation of Ser. No. 489,255, Apr. 27, 1983, abandoned. This application Aug. 23, 1985, Ser. No. 768,689

Int. Cl.[4] B23Q *7/04*; B65G *47/90*; B25J *9/00*

U.S. Cl. 414—744 A **14 Claims**

1. Apparatus for producing compound movement of a head member and adapted for quickly and successively transferring a supply of heavy articles, said apparatus comprising a first clutch-brake unit and a second clutch-brake unit each including a housing confining a cooling fluid and rotatably supporting an input drive member and a coaxial output drive member, each said housing enclosing means including a set of interfitting annular clutch plates and discs for connecting the corresponding said input drive member to the coaxial said output drive member, each said housing also enclosing means including a set of interfitting annular brake plates and discs for connecting the corresponding said output drive member to said housing, each said housing further enclosing axially movable



actuating means for selectively engaging said clutch plates and discs and said brake plates and discs, means for continuously driving said input drive member of each said clutch-brake unit, an elongated shaft supporting said head member, first drive means for moving said shaft axially in response to rotation of said output drive member of one of said clutch-brake units, second drive means for rotating said shaft in response to rotation of said output drive member of the other said clutch-brake unit, and said actuating means within each said clutch-brake unit being independently movable for adjustably selecting rotation and linear movement of said shaft and said head member.

4,589,819

WORKPIECE LOADING/UNLOADING DEVICE FOR A PRESS OR THE LIKE

Shojiro Shirao, Komatsu, Japan, assignor to Kabushiki Kaisha Komatsu Seisakusho, Tokyo, Japan

Filed May 31, 1984, Ser. No. 615,635

Claims priority, application Japan, May 31, 1983, 58-094885; May 31, 1983, 58-082521[U]; May 31, 1983, 58-082522[U]

Int. Cl.[4] B30B *15/30*

U.S. Cl. 414—752 **15 Claims**

1. A device for loading and/or unloading workpieces into and/or from a press or like work processing machine, comprising:

(a) a support frame adapted to be mounted to a desired work processing machine;

(b) a carriage mounted to the support frame for up and down motion relative to the same;

(c) a first drive mechanism for controllably moving the carriage up and down relative to the support frame;

(d) a parallelogram linkage comprising:

(1) a top link mounted to the carriage for up and down motion relative to the same;

(2) a bottom link; and

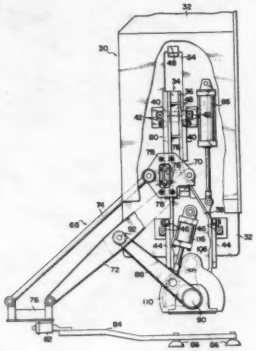
(3) a pair of side links of the same length extending in a vertical plane and in parallel spaced relationship to each

other and pivotally connected each at one end to the top link in horizontally spaced apart positions thereon;

(e) work carrier means coupled to the bottom link of the parallelogram linkage for releasably holding a workpiece to be loaded into and/or unloaded from the work processing machine;

(f) a drive lever having a length equal to half the length of each side link of the parallelogram linkage and pivotally coupled at one end to the carriage and at the other end to the midpoint of one of the side links of the parallelogram linkage; and

(g) a second drive mechanism for bidirectionally pivoting the drive lever relative to the carriage to cause the parallelogram linkage to reciprocate the work carrier means in



a horizontal direction, said second drive mechanism comprises:

(1) a bidirectional rotary actuator mounted to the support frame for displacement in a horizontal direction;

(2) drive means on the carriage for causing the bidirectional pivotal motion of the drive lever in response to the bidirectional rotation of the rotary actuator;

(3) a drive linkage for transmitting the bidirectional rotation of the rotary actuator to the drive means so as to allow the up and down motion of the carriage relative to the support frame; and

(4) link means operatively interconnecting the carriage and the rotary actuator so as to cause the horizontal displacement of the latter relative to the support frame with the up and down motion of the carriage.

4,589,820

STRUCTURES FOR SOLAR WIND BUILDINGS

Tony W. Butler, Jr., 1416 Woodhollow, #9819, Houston, Tex. 77057

Filed Jan. 27, 1984, Ser. No. 574,557
Int. Cl.[4] F03D *3/04*
U.S. Cl. 415—2 R **14 Claims**

1. In an energy conversion apparatus for converting naturally occurring wind energy to a usable energy form and including a wind driven means supported by an edifice having generally vertical, outwardly facing side surfaces impervious to wind, the improvement comprising:

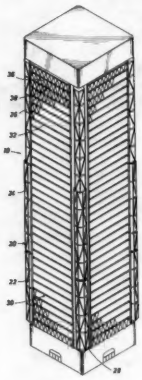
a substantially vertical, elongated channel formed in an exterior side surface of said edifice, said channel having a lower end and an upper end;

an elongated rotor assembly disposed partially within and along said channel,

the axis of rotation of said assembly being substantially vertical and disposed within said channel,

said rotor assembly comprising a plurality of cooperating and interconnected wind wheels aligned along said axis, each said wind wheel comprising first means for catching the wind passing substantially perpendicular to said channel and around said edifice for converting the wind energy in and near said channel into rotational energy of said rotor assembly,

one of said wind wheels being a lift wind wheel and further comprising second means for catching the wind passing substantially parallel to said channel for converting wind energy to mechanical energy to decrease the effective weight of said rotor assembly, and



the axial length of each said wind wheel increasing with increasing distance of each said wind wheel from said lower end; and

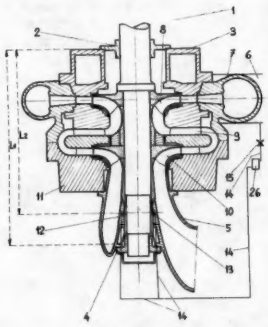
means driven by the lower end of said rotor assembly for converting the rotational energy of said rotor assembly to another energy form.

4,589,821

HIGH-HEAD MULTISTAGE PUMP-TURBINE

Jack Rondot, Meylan, and Séverin Casacci, La Tronche, both of France, assignors to NEYRPIC, Grenoble, France

Filed Jun. 6, 1983, Ser. No. 501,736
Claims priority, application France, Jul. 1, 1982, 82 11575
Int. Cl.[4] F04D *29/10*
U.S. Cl. 415—111 **4 Claims**



1. In a high-head multistage pump-turbine having a shaft (1) supported by an upper hydrodynamic bearing (2) and a lower bearing attached to a bend (5) and being supplied with water from a high-pressure duct (6), and comprising sealing means between said shaft and said bend (5), the improvement comprising a hydrostatic bearing (12) directly supplied with water

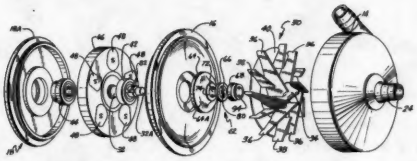
under pressure from said high-pressure duct and acting as both a bearing and as said sealing means, and comprising water pockets for receiving said water through channel means from said high pressure duct.

4,589,822

CENTRIFUGAL BLOOD PUMP WITH IMPELLER

Earl W. Clausen, Wayzata, and Lloyd C. Hubbard, Minnetonka, both of Minn., assignors to MICI Limited Partnership IV, Minneapolis, Minn.

Filed Jul. 9, 1984, Ser. No. 628,756
Int. Cl.⁴ F04D *29/12, 29/28*
U.S. Cl. 415—170 A **9 Claims**



1. A centrifugal pump for pumping a biological fluid such as blood comprising:

a pump housing having a pumping chamber therein and having an inlet and an outlet connected to the pumping chamber;

a shaft extending in an axial direction in the pump housing for defining a rotational axis;

a seal for providing a fluid-tight seal interface surrounding the shaft at position spaced in an axial direction from an inner surface of a wall of the pump housing; the seal having a seal stator connected to and extending from the wall of the pump housing, a seal rotor, and means for urging the stator and rotor into engagement at the seal interface; and

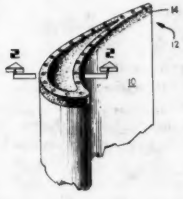
an impeller for rotation about the rotational axis, the impeller having a hub with an outer surface; and having a plurality of first blades attached to and extending outward from the hub, each of the first blades having a rear edge which is generally parallel to the wall and which is positioned in the axial direction closer to the wall than is the hub and each having an inner edge which extends from the rear edge to the hub and which is generally parallel to and closely spaced from an outer surface of the seal to cause the seal interface to be in a high fluid flow area, wherein the outer surfaces of the hub and the seal form an essentially continuous outer surface so that trapped air within the biological fluid will not tend to accumulate adjacent the seal interface.

4,589,823

ROTOR BLADE TIP

William K. Koffel, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio

Filed Apr. 27, 1984, Ser. No. 604,671
Int. Cl.⁴ F01D *5/20*
U.S. Cl. 416—92 **6 Claims**



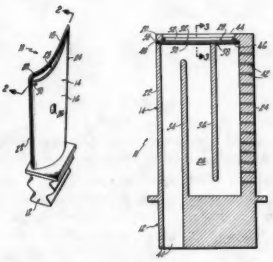
1. In a rotor blade which is rotatable with respect to a stationary surface, an improved blade tip with an abrasive coating bonded thereto at a bonding surface, said tip having a contour which is effective for providing a wearing surface if said tip contacts said stationary surface while rotating, wherein the area of said wearing surface is less than the area of said bonding surface, thereby reducing the resulting shear force per unit area in said abrasive coating along said bonding surface.

4,589,824

ROTOR BLADE HAVING A TIP CAP END CLOSURE

Joseph R. Kozlin, Jupiter, Fla., assignor to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 844,257, Oct. 21, 1977, abandoned.
This application Aug. 7, 1979, Ser. No. 64,604
Int. Cl.⁴ F01D *5/18*
U.S. Cl. 416—97 R **19 Claims**



1. For an axial flow rotary machine, a rotor blade structure which comprises:

an airfoil section having a pressure side wall and a suction side wall which form an internal cavity therebetween wherein said airfoil section has a tip region including

a chordwisely continuous suction side wall,

a chordwisely continuous pressure side wall,

an uninterrupted lip extending inwardly from the chordwisely continuous seal surface, and

an aperture in at least one of said walls of the airfoil section spanwisely inward of the chordwisely continuous side walls which has a continuous perimeter to provide access to the continuous seal surface of the uninterrupted lip during manufacture of the blade;

a one piece tip cap which has an outer surface oriented in opposing relationship to the continuous seal surface of the uninterrupted lip such that the entire perimeter of the outer surface of the tip cap is engageable by the continuous seal surface of the uninterrupted lip in response to rotational forces resulting from operation of the axial flow rotary machine; and,

a plug disposed in said aperture which engages the perimeter of the aperture for sealing of the aperture and chordwise retention of the tip cap, the plug having an outer surface flushly contoured to match the geometry of the side wall which the plug engages.

4,589,825

HIGH-PRESSURE CLEANING UNIT WITH A BYPASS VALVE

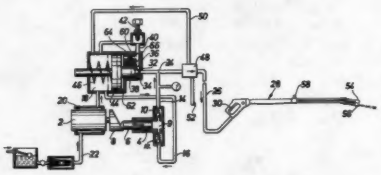
Jorgen Schmidt, Hadsund, Denmark, assignor to Knud Erik Westergaard, Hadsund, Denmark

Filed Nov. 21, 1984, Ser. No. 673,887
Claims priority, application Denmark, Nov. 25, 1983, 5388/83
Int. Cl.⁴ F04B *49/02, 49/08*
U.S. Cl. 417—290 **2 Claims**

1. High-pressure cleaning apparatus comprising:

a water outlet, a positive-displacement pump, a discharge conduit communicating with said water outlet and said

pump, a pressure-controlled bypass valve communicating with said discharge conduit for connecting said pump to bypass condition at the pressure rise occurring when the water outlet of the high-pressure cleaning apparatus is shut off, and means for ensuring that switching said bypass valve to a bypass-blocking position occurs with a time delay for minimizing, upon stopping said pump, any pressure build-up in said discharge conduit from said pump, said bypass valve opening at a positive working pressure, said pump having a delivery side and an inlet side and said bypass valve connecting the pump's delivery side with its



inlet side upon such opening, a bypass conduit, a connecting duct thereto, a cylinder having a chamber communicating with said connecting duct, a spring-loaded piston in said cylinder for controlling said bypass valve, said cylinder chamber-through said connecting duct to said bypass conduit-during steady-state condition having the water pressure prevailing in said bypass conduit, said time-delay ensuring means comprising constriction in said connecting duct, which causes said time delay by delaying the pressure change transmission from said bypass conduit to said cylinder chamber.

4,589,826

METHOD OF LUBRICATING BEARINGS OF A MACHINE HANDLING LIQUEFIABLE GAS

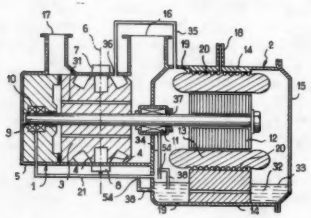
Bernard Zimmern, Vantage Point Condominium, 6 New St., East Norwalk, Conn. 06855, and Sadafumi Noda, Isahaya, Japan, assignors to Bernard Zimmern, East Norwalk, Conn.

Continuation-in-part of Ser. No. 597,120, Apr. 5, 1984, Pat. No. 4,553,399. This application Feb. 7, 1985, Ser. No. 699,150

Claims priority, application France, Apr. 14, 1983, 83 06079; Feb. 10, 1984, 84 02057

Int. Cl.[4] F04B *17/00*; F25B *43/02*

U.S. Cl. 417—368 **17 Claims**



3. A device for lubricating bearings of a rotating machine such as a compressor or expansion machine used in a closed-loop circuit in which a fluid circulates, said fluid being able to change from a liquid state to a gaseous state and conversely, said device comprising a reservoir adapted to contain oil up to a certain level, conduit means for feeding the reservoir with said fluid from the closed-loop, and a plurality of lubricating conduits having one extremity terminating in at least one of said bearings, and another extremity opening in the reservoir above the oil level, wherein the lubricating conduits also communicate, with the reservoir below the oil level through at least one micro-orifice.

4,589,827

ELECTRIC MOTOR FAN

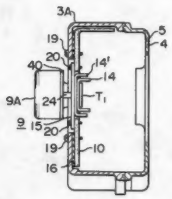
Hiroaki Mizoguchi, Ibaraki; Toshio Hayashibara, Katsuta; Tadashi Shitara, Ibaraki; Sigeyuki Katano, Ibaraki, and Hideo Kume, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 4, 1984, Ser. No. 617,100

Claims priority, application Japan, Jun. 3, 1983, 58-100062

Int. Cl.[4] F04B *17/00*

U.S. Cl. 417—423 R **8 Claims**



1. An electric motor fan comprising a fan driven by a motor, a case internally mounting the fan and having a scroll providing an air path for guiding the air supplied by said fan, and a control unit including an output transistor assembly including a transistor means for controlling the drive of said motor, heat radiation means connected to said transistor and mounted to said scroll at its portion substantially apart from said fan for radiating the heat generated by said transistor, said heat radiation means comprising at least one heat radiation fin mounted on the internal wall surface of said scroll portion within said air path so as to be in substantially the same plane as the internal wall surface of said scroll portion, said heat radiation fin is mounted on the internal wall surface of said scroll portion through a packing made of a heat insulating material.

4,589,828

ROTATION PREVENTING DEVICE FOR AN ORBITING MEMBER OF A FLUID DISPLACEMENT APPARATUS

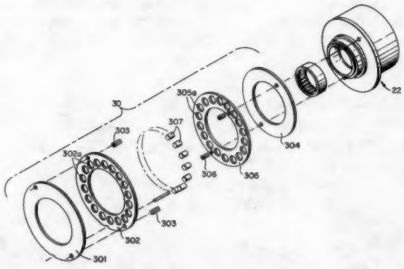
Tadashi Sato; Seiichi Sakamoto, and Kiyoshi Terauchi, all of Gunma, Japan, assignors to Sanden Corporation, Japan

Filed Aug. 8, 1983, Ser. No. 521,257

Claims priority, application Japan, Aug. 7, 1982, 57-137649

Int. Cl.[4] F01C *1/02*

U.S. Cl. 418—55 **7 Claims**



1. In an orbiting member fluid displacement apparatus including a housing, a fixed member attached to said housing and having a first end plate from which a fixed fluid displacement member extends into the interior of the housing, an orbiting member having a second end plate from which an orbiting fluid displacement member extends, said fixed and orbiting fluid displacement members interfitting at a radial offset to make a line contact separating a fluid inlet from fluid outlet, and a driving mechanism connected to said orbiting member to drive said orbiting member in an orbital motion at a predeter-

mined orbital radius, and rotation preventing/thrust bearing means connected to said orbiting member for preventing rotation of said orbiting member and for carrying axial thrust load from said orbiting member during orbital motion, the improvement wherein said rotation preventing/thrust bearing means comprises:

an orbital body fixed to said orbiting fluid displacement member;

a fixed body fixed to said housing, said fixed body facing said orbital body at a predetermined clearance;

said fixed and orbital bodies each having a plurality of axially aligned, radially offset opposing pockets; and

a cylindrical shaped bearing element carried within each pair of said opposing pockets, with one of the axial end surfaces of said bearing elements in sliding contact with an orbital race of said orbital body, the other axial end surface of said bearing elements in sliding contact with a fixed race of said fixed body, and the outer cylindrical bearing surface of at least some of said bearing elements engaging the walls of said pockets in said fixed body so that the engagement of said bearing elements with the walls of said pockets prevents rotation of said orbiting member and the axial end surfaces of said bearing elements carry the axial thrust load from said orbiting member to said fixed member.

4,589,829

VANE PUMP

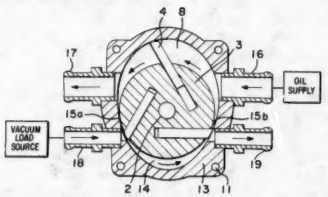
Hitoshi Ogawa, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 20, 1984, Ser. No. 642,207

Claims priority, application Japan, Aug. 20, 1983, 58-128715[U]; Aug. 20, 1983, 58-12816[U]; Aug. 20, 1983, 58-128717[U]; Oct. 14, 1984, 58-159821[U]

Int. Cl.⁴ F04C *2/00*

U.S. Cl. 418—259 **3 Claims**



1. A vane pump comprising:

a housing having an elliptical inner space;

a rotor mounted in said inner space for rotation about a fixed axis such that a peripheral surface of said rotor is spaced apart from a peripheral surface of said space to define gaps at two positions, whereby said rotor and housing cooperate to define first and second operating chambers in said space, said first operating chamber being larger than said second operating chamber, said operating chambers communicating at said gaps;

a plurality of vanes slidably positioned in said rotor and extendable into contact with said peripheral surface of said space;

a first inlet for said first operating chamber, said first inlet communicating with one of a source of oil and a vacuum load source;

a first outlet for said first operating chamber;

a second inlet for said second operating chamber, said second inlet communicating with the other of a source of oil and a vacuum load source; and

a second outlet for said second operating chamber,

wherein said gaps are sized so as to permit sufficient oil to be transferred from one of said operating chambers to the other of said operating chambers to form a continuous oil film about said inner space of said other of said operating chambers, whereby said other of said operating chambers is sufficiently lubricated by said continuous oil film.

4,589,830

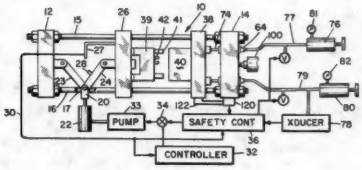
PRESS CONTROL SYSTEM

Burrell E. Clawson, 2425 Sunset Dr., Riverside, Calif. 92506

Continuation of Ser. No. 519,458, Aug. 1, 1983, abandoned. This application Apr. 18, 1985, Ser. No. 724,049

Int. Cl.⁴ B29C *47/93*

U.S. Cl. 425—150 **12 Claims**



1. In a press of the type which includes a floating platen and a press bed:

fluid pressure means for offering opposition to displacement of the platen toward the bed as a function of the degree of displacement of the platen toward the bed;

said fluid pressure means comprising a hydraulic cylinder including a piston mounted for reciprocation in the cylinder to alter the volume of its hydraulic cavity; and

said fluid pressure means further including a spring arranged to urge said piston in a direction to reduce the volume of said cavity and means for selectively altering the degree in which said piston is urged in said direction by said spring.

4,589,831

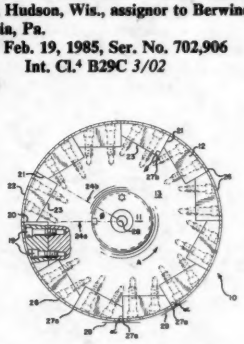
REMOVABLE MOLD SEGMENTS FOR ROTARY MOLDS

Ralph W. Weggel, Hudson, Wis., assignor to Berwind Corporation, Philadelphia, Pa.

Filed Feb. 19, 1985, Ser. No. 702,906

Int. Cl.⁴ B29C *3/02*

U.S. Cl. 425—195 **22 Claims**

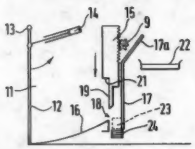


1. A rotary mold segment of truncated sectorial shape comprising: a top arcuate molding surface; a bottom surface; two opposing end walls connecting said top surface and said bottom surface wherein (a) said connections between each said end wall with said top surface defines a right angle with respect to a line drawn tangent to said arcuate top surface at each respective end of said top arcuate surface and (b) one of said connections between each said end wall with said bottom surface defines a right angle; and two opposing side walls connecting the respective sides of said top, bottom, and end wall sides.

4,589,832
BRIQUETTE MAKING MACHINE

Kenneth R. Ellis, Thetford, United Kingdom, assignor to Thetford International Products, Ltd., United Kingdom

Filed Feb. 26, 1985, Ser. No. 705,798
Int. Cl.[4] B29C *17/00*
U.S. Cl. 425—289 **10 Claims**

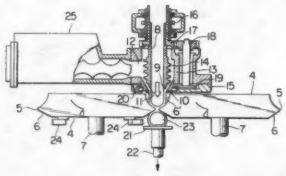


1. A machine for making briquettes from waste, including a waste-receiving bin;
a compression chamber adjacent to said waste receiving bin;
plate means to sweep said waste from the bin towards and at least partly into the initially open breach of said compression chamber;
power-driven guillotine means movable progressively to close off the initially open breach, to shear waste straddling said breach and to compress waste within said compression chamber;
power-driven piston means movable transversely to the guillotine means to clear the compressed waste from said compression chamber and further compress it;
a constricted discharge orifice against which the waste is further compressed and through which the further compressed waste eventually passes;
and grooving means forming a part of said constricted discharge orifice;
said grooving means being configured to groove longitudinally the emergent briquette.

4,589,833
DEVICE FOR FORMING BALLS OF PLASTIC MATERIAL

Torahiko Hayashi, Utsunomiya, Japan, assignor to Rheon Automatic Machinery Co., Ltd., Japan

Filed Feb. 27, 1984, Ser. No. 583,773
Int. Cl.[4] A21C *11/10*
U.S. Cl. 425—306 **5 Claims**

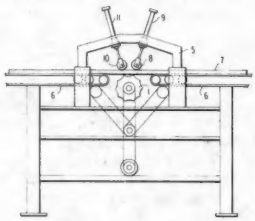


1. A device for forming plastic balls from a bar of plastic material, comprising a pair of identical circular cutters, each with top and bottom planar surfaces and a peripheral side surface, which cutters are rotatable about their respective axes, said axes disposed vertically and parallel to each other, and where said cutters are arranged on the same level, with a predetermined gap therebetween, each cutter being formed with a cutting member on the peripheral side surface, said cutting member consisting of a plural number of spiral arcuate blades having an upperside and an underside, where said blades are arranged within equi-angular ranges offset over respective circumferential parts extending along the peripheral side surface of the cutter such that any of the spiral arcuate blades starting at an upper end of the said peripheral side surface terminates near a lower end of the said peripheral side surface substantially under the starting point of an adjacent spiral arcuate blade, the edge of the blade being blunted throughout said blades length, the radius of a surface of revolution formed by the edges of the blades about the vertical axis of each cutter increasing gradually from the top to the bottom, said cutters being rotated at the same speed and in the same direction so that the spiral arcuate blades meeting in opposition to each other at the said gap are always at the same elevation, whereby the bar supplied downwardly toward and into said gap is separated by the cutters into one ball after another in succession.

4,589,834
DEVICE FOR GROOVING RUBBER MATERIAL

Seizaburo Inoue, Nashville, and Norvel L. Smith, Smyrna, both of Tenn., assignors to Bridgestone Corporation, Japan and Bridgestone (U.S.A.), Inc., Nashville, Tenn.

Filed Aug. 8, 1985, Ser. No. 763,591
Int. Cl.[4] B29C *15/00*
U.S. Cl. 425—369 **8 Claims**



1. A device for striating an unvulcanized rubber strip at equal intervals comprising:
(a) a pleat roll having a plurality of ridges disposed thereon in the axial direction of the roll,
(b) a first pressing member including a plurality of first rollers, each of which presses said rubber strip to said pleat roll independently, said first rollers arranged to gaps between them,
(c) a second pressing member including a plurality of second rollers, each of which presses said rubber strip to said pleat roll independently, said second rollers having widths greater than the gaps between said first rollers of the first pressing member and the gaps between said second rollers narrower then the widths of said first rollers, and being positioned so as to connect the discontinuous striae of said rubber strip striated with the first pressing member and the ridges of said roll, and
(d) transferring means so as to interpose and move said rubber strip between said pleat roll and the first and second pressing members.

4,589,835
TUBE SEALING APPARATUS

Elmer F. St.Amand, San Fernando, Calif., assignor to Saint Amand Manufacturing Co., San Fernando, Calif.

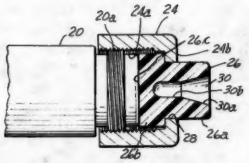
Filed Jul. 5, 1984, Ser. No. 627,973
Int. Cl.[4] B29C *33/02, 57/10*
U.S. Cl. 425—392 **8 Claims**

1. An apparatus for sealing an open end of the tubular tip of a pipette constructed from a thermoplastic material, comprising:
(a) a base;
(b) a hollow housing adjustably carried by said base;
(c) an electrically heated, generally cylindrically shaped heating element carried within said hollow housing, said element being externally threaded proximate a first end

thereof and having means at the opposite second end thereof for interconnecting said element with a source of electricity;

(d) sealing means operably associated with said heating element, comprsing:

(i) an internally threaded connector ring adapted to be threadably connected to said first end of said heating element; and



(ii) a body portion constructed from polytetrafluoroethylene said body portion having a pipette tip receiving cavity formed internally thereof and including an enlarged diameter portion adapted to be received within said connector ring, said enlarged diameter portion having an end portion adapted to be maintained in engagement with said first end of said heating element when said connector ring is threadably connected to said first end of said heating element.

4,589,836

HYDRAULIC PRESS

Bo Fjellman, Mariestad, Sweden, assignor to Fjellman Press AB, Sweden

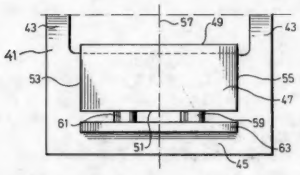
PCT No. PCT/SE83/00098, § 371 Date Nov. 9, 1983, § 102(e) Date Nov. 9, 1983, PCT Pub. No. WO83/03382, PCT Pub. Date Oct. 13, 1983

Continuation of Ser. No. 563,393, Nov. 9, 1983, abandoned. This PCT application Mar. 25, 1983, Ser. No. 741,012

Claims priority, application Sweden, Mar. 22, 1982, 8201802

Int. Cl.[4] B29C *33/00*

U.S. Cl. 425—406 **18 Claims**



1. Hydraulic press comprising a frame having opposed platens provided with platen surfaces positioned for relative movement toward and away from each other, in which at least one of the platens is located on a pressure plate structure comprising mutually parallel plates having outwardly defining edges, said pressure plate structure constituting means for transferring the pressing force of the press to the article being pressed between the platens, and in which said pressure plate structure is carried solely by a plurality of horizontally adjustable individual support means mounted between the outwardly defining edges of said pressure plate structure and in which said support means are horizontally displaceable to a predetermined position such that the corresponding platen surface assumes a predetermined configuration during the pressing operation.

4,589,837

MACHINE FOR PRODUCING CONTAINERS FROM EXTRUDED AND BLOW-MOLDED PLASTIC MATERIAL

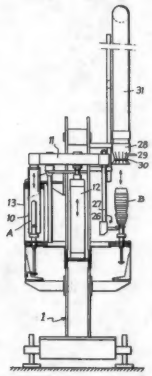
Antoine Di Settembrini, Le Lubrier, 84480 Bonnieux, France

Division of Ser. No. 390,764, Jun. 21, 1982, abandoned. This application Apr. 2, 1985, Ser. No. 719,225

Claims priority, application France, Jun. 26, 1981, 81 12634

Int. Cl.[4] B29C *49/64*

U.S. Cl. 425—522 **7 Claims**



1. A machine for producing containers from extruded and blow-molded plastic preforms, comprising:

a continuous transfer chain with links having vertical pins for receiving said preforms, said pins extending a predetermined height above said continuous transfer chain;

a stepwise drive mechanism for moving said transfer chain horizontally in stepwise movements;

a controlled cooling device for successively supplying controlled amounts of heat to said preforms, said controlled cooling device including a plurality of substantially cylindrical, vertically positioned bell-shaped enclosures each having a closed upper end, and a support connected to said bell-shaped enclosures and slideable vertically in a reciprocal movement over a range at least equal to said predetermined height of said vertical pins;

a shaping device for receiving said preforms moved by said transfer chain; and

a finishing device for receiving said preforms from said shaping device as finished containers;

said controlled cooling device, said shaping device and said finishing device comprising a closed course through which said continuous transfer chain moves.

4,589,838

MULTIPLE STATION, MULTIPLE CLAMP ASSEMBLY ROTARY BLOW MOLDING MACHINES

William E. Ziegler, 2570 Coachlite Dr., Tecumseh, Mich. 49286

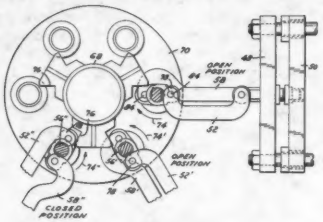
Filed Apr. 9, 1985, Ser. No. 721,324

Int. Cl.[4] B29C *17/07, 17/12;* **B29D** *23/03*

U.S. Cl. 425—540 **23 Claims**

1. A multiple station, multiple clamp assembly rotary blow molding machine comprising dual opposed moveable mold platens in each clamp assembly, at least one toggle linkage actuatably attached to each platen, rotatable crank means in engagement with each toggle linkage for actuation thereof and

engagement means on said crank means for rotatable actuation thereof, said crank means on sequential clamp assemblies rotatable in opposite directions to close the respective mold platens of the sequential clamp assemblies.

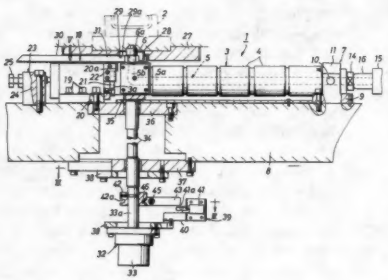


4,589,839

HOT RUNNERS FOR AN INJECTION MOLDING MACHINE

Masanobu Kurumaji; Tsutomu Sano; Hiroaki Kondo, all of Kobe; Masao Mizutani, Mie, and Kazuei Yodono, Saitama, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan

Filed Sep. 14, 1984, Ser. No. 650,541
Claims priority, application Japan, Sep. 16, 1983, 58-171758
Int. Cl.[4] B29C *45/20*
U.S. Cl. 425—547 **4 Claims**



1. An injection molding machine, comprising:

a base frame;

an extruder which includes a first nozzle;

a runner body having a hot runner formed in an interior thereof, said runner body being disposed between the mold and the extruder and which further includes a second nozzle at an outlet end thereof, the hot runner being substantially L-shaped;

connecting means engaging said first nozzle wherein said hot runner further comprises a horizontal channel adapted to communicate with the extruder at an inlet end portion of the runner body via said connecting means and a vertical channel communicating with the horizontal channel substantially perpendicular thereto and having said second nozzle at an outlet end of the runner body;

a support assembly being mounted on said base frame and disposed toward the connecting means between the runner body and the extruder, the inlet end of the runner body being supported by the support assembly and pivotally and slidably longitudinally mounted thereon;

stopper means fixed to said base frame and provided at the outlet end of the runner body for withstanding the pressing force of the extruder and for positioning the first nozzle wherein the stopper means is movably mounted on said base frame;

means mounted on said base frame for adjusting the horizontal position of said stopper means and said first nozzle; and

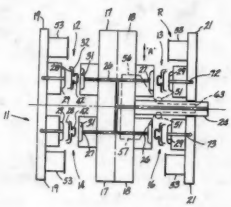
nozzle pressing means for pressing said second nozzle against the mold.

4,589,840

APPARATUS AND METHOD FOR REMOVING MOLDED ARTICLES IN UNIFORM ORIENTATION

Robert D. Schad, Toronto, Canada, assignor to Husky Injection Molding Systems Ltd., Bolton, Canada

Filed Mar. 18, 1985, Ser. No. 712,520
Int. Cl.[4] B29C *45/40*
U.S. Cl. 425—556 **10 Claims**



1. In an injection molding apparatus for continuously molding articles including a pair of relatively movable mold platens, each platen supporting a mold element cooperating to define a mold cavity, said platens cycling continuously through a cavity opening stroke and a cavity closing stroke, an improved device for receiving and dispensing molded articles in a uniform physical orientation comprising:

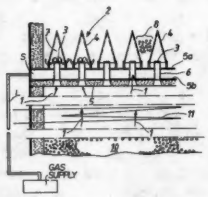
a receiving means carried by one of said platens, said receiving means being movable from a first position defining a release position to a second position defining a receiving position in proximity to a molded article retained on one of said platens, and a transfer means carried by said one platen responsive to relative motion between said platens for driving said receiving plate from said first position to said second position, said receiving means being but a single elongated channel having a predetermined cross-section mating with a chute having a similar cross-section.

4,589,841

CAP FOR NOZZLES IN AN AFTER COMBUSTION FLUIDIZED BED

Jörgen Bergkvist, Finspong, Sweden, assignor to Asea Stal AB, Västerås, Sweden

Continuation-in-part of Ser. No. 606,146, May 2, 1984, abandoned. This application Oct. 17, 1985, Ser. No. 787,715
Int. Cl.[4] F23D *19/00*
U.S. Cl. 431—170 **3 Claims**



1. In a boiler having at least a post-combustion fluidized bed and an underlying combustion fluidized bed wherein flue gases from said underlying bed enter said post-combustion bed via a

plurality of gas inlet nozzles and fluidize particulate bed material in said post-combustion bed,

said post-combustion bed including a floor defined by a pair of spaced apart plates defining a plenum space therebetween,

gas tubes extending through said plates and said nozzles being located at the ends of said tubes,

said gas tubes each having at least one hole communicating with said plenum space,

means connected to said plenum space for supplying surges of pressurized gas to said nozzles through each said hole of said gas tubes for periodically cleaning said nozzles of any impurity deposits which could block the flow of flue gases therethrough,

a nozzle cap overlying each of said nozzles and being embedded in said bed material in said post-combustion bed,

each said nozzle cap comprising a deflecting member for guiding the flue gases laterally into the particulate bed material,

each of said tubes comprising an open ended injection tube with said nozzle thereof being small in relation to the lower area of said overlying nozzle cap,

each said cap having upwardly converging walls, each said wall forming a steep angle between 10° and 30° with the axis of the respective inlet nozzle,

each said cap having a lower end lying below the respective inlet nozzle, and

each said cap providing a cap space about the open end of the respective tube, which cap space is traversed by the flue gases passing through the tubes, and said cap space having such a volume as to form a dust-gas cushion between said cap and said open end,

whereby the steep angle of each said wall of the respective cap presents steep angles of impact of the flue gases against the internal surface of each said wall to thereby avoid cap erosion, said steep angles avoid the tendency of the particulate bed material to adhere to the outer surfaces of said walls, the cushion serving as a buffer to deflect the incoming flue gases to thereby avoid clogging or adherence of dust to the respective cap, and said walls at said steep angle presenting large surfaces to said bed material to be thereby cooled during fluidization of said bed material.

4,589,842

DEVICE FOR ADJUSTING THE VERTICAL POSITION OF WICK IN OIL BURNER

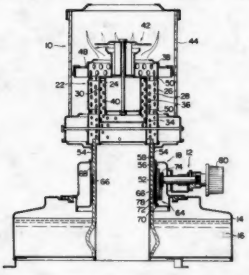
Kazuharu Nakamura, and Kazuhiko Takeuchi, both of Nagoya, Japan, assignors to Toyotomi Kogyo Co., Ltd, Aichi, Japan

Filed Jul. 19, 1984, Ser. No. 632,344

Claims priority, application Japan, Jul. 21, 1983, 58-113467[U]

Int. Cl.⁴ F23D *3/34*

U.S. Cl. 431—301 **6 Claims**



1. A device for adjusting the vertical position of a wick in an oil burner which is adapted to rotate a wick operating shaft having a knob provided at one end thereof to vertically move a wick, comprising:

a stopper means mounted on said wick operating shaft;

an adjusting member positioned to be engaged with said stopper means so as to regulate the range of movment of said stopper means, said adjusting member being provided with a plurality of engagement means;

at least one fixing means positioned to be selectively engaged with at least one of said engagement means so as to keep said adjusting member at a stationary state; and

a resilient means resiliently forcing said adjusting member into a position providing the engagement between said at least one of said engagement means and said fixing means;

said adjusting member being also adapted to be moved against said resilient means to release the engagement between said at least one of said engagement means and said fixing means and to allow at least another one of said engagement means to be engaged with said fixing means, so that the range of rotation of said wick operating shaft may be varied to variably determine the uppermost position of said wick.

4,589,843

INFRA-RED IRRADIATION

Thomas M. Smith, 1415 Golf Rd., Cinnaminson, N.J. 08077

Continuation-in-part of Ser. No. 592,793, Mar. 23, 1984, and a continuation-in-part of Ser. No. 567,270, Dec. 30, 1983, abandoned, and a continuation-in-part of Ser. No. 509,161, Jun. 29, 1983, Pat. No. 4,500,283, and a continuation-in-part of Ser. No. 435,412, Oct. 20, 1982, abandoned, and a continuation-in-part of Ser. No. 292,167, Aug. 12, 1981, Pat. No. 4,474,552. This application Jul. 9, 1984, Ser. No. 628,989

Int. Cl.⁴ F27B *9/28*; F23N *5/00*; C21D *9/52*

U.S. Cl. 432—59 **4 Claims**

1. In combination, an infra-red irradiator that generates infra-red energy at a temperature high enough to ignite a substrate being irradiated, the irradiator having an irradiation zone through which an elongated ignitable substrate web is conducted in one direction to be irradiated as the web moves, web-guiding means positioned to guide the moving substrate sheet through a path into, through and out of the irradiation zone, and solid snuffer means in the guide path downstream of the irradiation zone to keep fire on the substrate from moving past the snuffer, the snuffer means having a pair of opposed snuffer bars positioned adjacent to but spaced from the respective faces of the guided substrate, and an actuating mechanism connected for moving the snuffer bars toward each other to engage both faces of the web between them and thus cut off the movement of fire downstream of the web.

4,589,844

HEAT EXCHANGE APPARATUS FOR INDUSTRIAL FURNACES

Paul W. Loukas, Willowdale; Rudolf E. Braune, Scarborough, and Ekkehard Fischer, Agincourt, all of Canada, assignors to Advanced Combustion Inc., Weston, Canada

Filed Jul. 25, 1984, Ser. No. 634,447

Int. Cl.⁴ F24H *1/00*; F24C *3/00*

U.S. Cl. 432—223 **12 Claims**

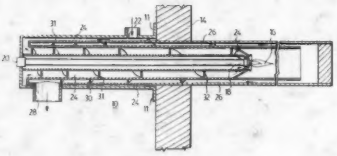
1. A heat exchanger for heating air supplied to a burner, said heat exchanger including:

first passage means through which combustion gas is exhausted from the burner;

second passage means through which combustion air is supplied to said burner;

the first and second passage means being arranged to transfer heat from the combustion gas to the combustion air; and

at least one of the first and second passage means including helical guide means providing a substantially helical path along which fluid is directed through the at least one passage means; the helical guide means having a variable



pitch which changes in a predetermined manner to control fluid pressure and velocity in the at least one passage means; the helical guide means being secured to an inner wall of the one passage means about which the helical guide means extends, and the helical guide means not extending outwardly entirely across the passage means such that a small gap is present between the outer edge of the helical guide means and an outer wall of the at least one passage means.

4,589,845

APPARATUS FOR THE PREPARATION OF A FOAMED ARTICLE OF A POLYOLEFIN RESIN

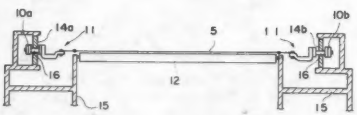
Junsuke Naohara, Hiratsuka; Toshiki Horie, Yokohama, and Toru Kino, Hiratsuka, all of Japan, assignors to Japan Styrene Paper Corp., Tokyo, Japan

Filed Jan. 24, 1985, Ser. No. 694,248

Claims priority, application Japan, Jan. 26, 1984, 59-12739

Int. Cl.[4] F27D *3/00*; B65G *15/60*; F27B *9/22*

U.S. Cl. 432—239 **5 Claims**



1. An apparatus for thermally treating a sheet of a cross-linkable and foamable polyolefin resin, comprising:

a furnace;

a conveyor assembly providing a substantially flat path along which the sheet is supported and conveyed through the furnace, said assembly including:

a pair of parallel-disposed endless roller chains having an endless conveyor belt formed of a plain weave wire net disposed between and connected to said chains by a plurality of rigid links for movement therewith, each of said chains being in mesh with a drive sprocket and one or more idler sprockets spaced therefrom;

a plurality of parallel, spaced-apart rolls, each stationarily disposed and oriented perpendicularly to the direction of conveyor belt movement and positioned for supporting engagement and rolling contact with said conveyor belt;

an elongated guide means provided adjacent to each side of said conveyor belt and engageable by said links and cooperating therewith for preventing both vertical and lateral movement of the links and conveyor belt; and

a heating means provided in said furnace for heating the sheet moved on said conveyor belt so that said sheet may undergo cross-linking during its movement through the furnace by said conveyor assembly.

4,589,846

TOOTH TRANSILLUMINATING LIGHT HOLDER

Jerry D. Annoni, 450 Maple Ave., Vallejo, Calif. 94591

Filed Sep. 29, 1982, Ser. No. 427,850

Int. Cl.[4] A61B *1/24*

U.S. Cl. 433—30 **2 Claims**

1. Tooth transillumination apparatus for directing a relatively high intensity light beam directly against and through a side surface of a tooth to cause the tooth to transmilluminate and to give ample light within the tooth for accomplishing endodontic procedures, said tooth transillumination apparatus comprising,

light source means for producing a relatively high intensity beam of light and having a light emitting end portion of relatively small size as compared to the side surface of a tooth so that said end portion can be located closely adjacent to the tooth to direct all of the light from said end portion into the side surface of the tooth,

light source holder means for holding the light source means with said light emitting end portion closely adjacent to and in alignment with the side surface of the tooth to cause the tooth to be transilluminated by the relatively high intensity light emitted from said end of the light source means, and

clamp means for clamping the light source holder means onto the tooth to be transilluminated and effective to retain said light emitting end portion of the light source means in alignment with the side surface of the tooth.

4,589,847

TARTAR-REMOVING DENTAL HANDPIECE

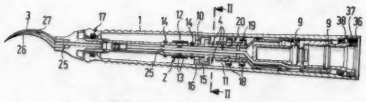
Hans Logé; Eugen Eibofner, both of Biberach, and Walter Mössle, Bad Waldsee, all of Fed. Rep. of Germany, assignors to Kaltenbach & Voight GmbH & Co., Biberach, Fed. Rep. of Germany

Filed Aug. 7, 1984, Ser. No. 638,635

Claims priority, application Fed. Rep. of Germany, Aug. 8, 1983, 3328605

Int. Cl.[4] A61C *1/08*

U.S. Cl. 433—126 **14 Claims**



9. A tartar-removing dental handpiece comprising:

an elongated gripping sleeve;

a vibratable tartar-removing instrument arranged at one end of the gripping sleeve;

a pneumatically operable vibration generator arranged in the gripping sleeve to generate vibrations;

means connecting the vibration generator to the tartar removing instrument to transmit vibrations therebetween;

a compressed-air conduit extending through the gripping sleeve to the vibration generator for conducting compressed air thereto;

a cooling medium supply conduit extending through the grippin sleeve to conduct a cooling medium to the tartar-removing instrument;

a coupling member arranged at the end of the gripping sleeve remote from the tartar-removing instrument to connect the dental handpiece to a cooling medium source and a compressed-air source, the coupling member including

(i) a first connecting conduit for conducting the cooling medium therethrough,

(ii) a second connecting conduit for conducting compressed-air through the coupling member and,

(iii) a guide trunnion extending into and being rotatable within the gripping sleeve and being releasably connected to the gripping sleeve;

a first pair of spaced sealing rings mounted on and extending around the guide trunnion and engaging the gripping sleeve, the first pair of sealing rings, the guide trunnion and the gripping sleeve forming a first annular passage in communication with the cooling medium supply conduit and the first connecting conduit to conduct the cooling medium therebetween independent of the annular orientation of the guide trunnion within the gripping sleeve; and

a second pair of spaced sealing rings mounted on and extending around the guide trunnion and engaging the gripping sleeve, the second pair of sealing rings, the guide trunnion and the gripping sleeve forming a second annular passage in communication with the compressed-air conduit and the second connecting conduit to conduct compressed-air therebetween independent of the annular orientation of the guide trunnion within the gripping sleeve;

the gripping sleeve including a rear member defining an axially extending socket receiving the guide trunnion;

the compressed air conduit including

(i) a first tubular portion extending around, and forming a radial space with, the rear member of the gripping sleeve to receive compressed air from the second annular passage and guide the compressed air forwardly therefrom past the rear member, and

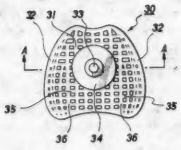
(ii) a conical portion extending forward from the first tubular portion to guide the compressed air radially inwardly therefrom and radially inside the vibration generator.

4,589,848

TONGUE PRESS

Miyako Inoue, Tokyo, Japan, assignor to Inoue Attachment Co., Ltd., Tokyo, Japan

Filed Feb. 7, 1985, Ser. No. 699,351
Int. Cl.⁴ A61C *5/00*
U.S. Cl. 433—140 **6 Claims**



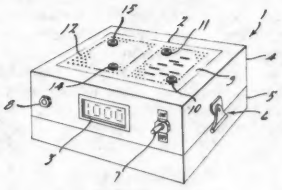
1. A tongue press for use with an external or internal tongue press holder to restrain and protect a human tongue during dental treatment or the like, comprising a central body portion and an edge portion for covering at least a part of the upper surface and an edge of a tongue, said tongue press having a reticulate structure constituted by lateral strips and vertical strips and being uniform in thickness at both its central body portion and edge portion and a joining protuberance extending from the upper surface of said body for connection with a tongue press holder.

4,589,849

DEXTERITY EVALUATION APPARATUS

James E. Casey, Lemont, Ill., assignor to Kelly Services, Inc., Troy, Mich.

Filed Apr. 22, 1985, Ser. No. 726,011
Int. Cl.⁴ G09B *9/00*
U.S. Cl. 434—258 **4 Claims**



1. An apparatus for assisting in the evaluation of the dexterity of an individual comprising a circuit board comprising first and second adjoining arrays of apertures, the first of said arrays being pre-wired to establish the wiring pattern for said second array;

signal circuit means connected to said circuit board and responsive to the actuation of a first switch means by the individual for producing a START signal and further responsive to the actuation of a second switch means by the individual after said second array has been wired for producing a STOP signal; and

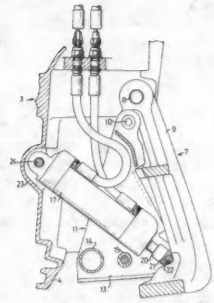
digital timing means for monitoring and displaying the period of time required by the individual to complete the wiring of said second array including timer circuit means for driving a digital display and control circuit means responsive to said START signal for initiating said timer circuit means and further responsive to said STOP signal for inhibiting said timer circuit means.

4,589,850

BOAT PROPELLER DRIVE UNIT

Ulf Söderbaum, Skärhamn, Sweden, assignor to AB Volvo Penta, Gothenburg, Sweden

Filed Sep. 18, 1984, Ser. No. 651,848
Claims priority, application Sweden, Sep. 20, 1983, 8305060
Int. Cl.⁴ B63H *5/12*
U.S. Cl. 440—61 **8 Claims**



1. Boat propeller drive unit comprising a portion intended to be fixed in an opening on a boat transom stern for connection

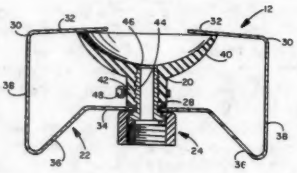
to an engine accommodated on the inside of the transom stern and to a propeller drive shaft housing disposed outside the transom stern and carried by a fork-like support structure having shanks journalled in the fixed portion for rotation about a transverse horizontal pivot axis under the influence of a pair of pressurized-medium actuated piston-cylinder units disposed on either side of the centerplane of a drive shaft of the engine, coacting locking members being arranged for preventing in their locking position the support structure from swinging about said pivot axis, characterized in that one end of each piston-cylinder unit is pivotally connected to the fixed portion, whereas the other end rests on an abutment surface on the fork-like support structure; and in that a first of the locking members is disposed on an intermediate member pivotally connected to the piston-cylinder units and to the support structure in such a way that the position of said locking member relative to a second locking member, carried by the support structure, with which said first locking member coacts, remains unchanged upon alteration of the angle of the support structure relative to the fixed portion.

4,589,851

FLUSHING DEVICE FOR OUTBOARD MOTORS

Michael A. Karls, Hilbert, Wis., assignor to Brunswick Corporation, Skokie, Ill.

Filed May 9, 1985, Ser. No. 732,113
Int. Cl.[4] B08B *9/00*
U.S. Cl. 440—88 **5 Claims**



1. A flushing device for supplying water to a cooling water inlet opening in the bottom surface of a generally horizontal planar element fixed above the propeller shaft of an outboard motor, said device comprising:

(A) a generally cup shaped resilient sealing element for covering the cooling water inlet opening, said sealing element including a water passage for supplying water to said water inlet and

(B) a unitary mounting bracket formed from a single strip of sheet metal and attached to said resilient sealing element for holding said resilient sealing element compressed against said bottom surface, said mounting bracket including two projections on opposite ends of said strip for engaging an upper surface of said planar element on opposite sides, said mounting bracket including projections for extending into the region normally occupied by a propeller mounted on said propeller shaft.

4,589,852

MOISTURE INHIBITOR

Donald G. Price, P.O. Box 833, Dana Point, Calif. 92629

Filed Nov. 15, 1984, Ser. No. 671,625
Int. Cl.[4] B63H *21/26*
U.S. Cl. 440—89 **11 Claims**

11. A moisture inhibitor, comprising:

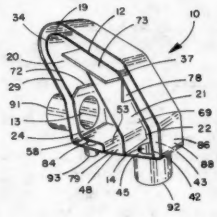
a housing having a cavity, an entrance port passing through the housing to the cavity of the housing, an exit port passing through the housing to the cavity of the housing;

an upper trap coupled to the housing in the cavity of the housing above the entrance port;

a dividing wall inside the housing in the cavity of the housing coupled to the housing between the entrance port and the exit port wherein the dividing wall rises up in the cavity of the housing above the entrance port and above the exit port wherein the dividing wall has an upper portion and a cavity;

a lower trap coupled to the housing below the entrance port;

a sloped wall coupled to the dividing wall so that the sloped



wall slopes down and away from the entrance port towards the exit port; and

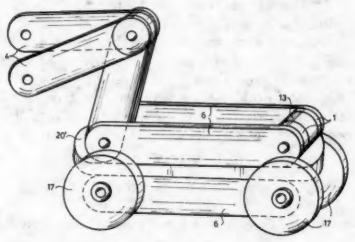
cooling means coupled to the housing wherein the dividing wall is coupled to the cooling means wherein the cooling means has an inlet at the upper portion of the dividing wall.

4,589,853

CONSTRUCTION SET, PREFERABLY A TOY SET

Valeria Hidvegi, Budapest, Hungary, assignor to Kozponti Valto- es Hitelbank Rt. Innovecios Alap, Budapest, Hungary

PCT No. PCT/HU83/00004, § 371 Date Sep. 20, 1983, § 102(e) Date Sep. 20, 1983, PCT Pub. No. WO84/02853, PCT Pub. Date Aug. 2, 1984
PCT Filed Jan. 28, 1983, Ser. No. 666,087
Int. Cl.[4] A63H *33/12*
U.S. Cl. 446—123 **8 Claims**



1. A toy construction set, comprising building members and coupling members, said building members comprising:

disc members of a diameter forming a basic size a, said disc members having a common basic thickness v being at least one sixth and at most one third of said basic size a, said disc members including respective central throughgoing holes of a common basic diameter D being at least one sixth and at most one third of said basic size a;

elongated members with shapes symmetrical both to the longitudinal and transversal axes thereof, said elongated members having a common width substantially equal to said basic size a and a common thickness substantially equal to said basic thickness a, and having respective end regions with contour lines approaching semi-circles with diameters substantially equal to said basic size a, said elongated members having in said end regions respective throughgoing holes with diameters substantially equal to said basic diameter D, said holes have their center points lying on said longitudinal axis at a distance from the respective outermost points of said regions which is substantially equal to the half of said basic size a;

said coupling members comprising:
threaded bolts with an outer diameter d loosely fitting in said holes with said basic diameter D, said bolts having lengths at least about three times as long as said basic thickness v; and
nuts for engagement with said bolts, said nuts being outer size smaller than said basic size a and being larger than half said basic size a, said nuts being of thicknesses at most equal to said basic thickness a;
said building members further comprising connecting members having a width and height substantially equal to said basic size a, and a length at least equal to said basic size a, said connecting members being symmetrical relative to at least one symmetry plane and comprising pairs of end planes normal to said symmetry plane and a planar face normal to said end planes, and said connecting members each comprising at least two threaded bores with diverging axes for receiving and engaging said bolts;
said connecting members being formed by a semi-cylinder with a diameter equal to said basic size a and by a rectangular prism attached integrally to said semi-cylinder;
said connecting members having three said threaded bores whose axes are mutually normal to each other and intersect each other in the middle of said connecting member;
said building members further comprising additional elongated members having a common thickness substantially equal to said basic thickness v, said additional elongated members having shapes similar to that of said elongated members but having a common width substantially twice said basic size a, said additional elongated members having in their end regions respective throughgoing holes being substantially as large as said throughgoing holes of said disc members and having center points lying on the longitudinal axes of said members at a distance from the outermost points of said regions which is substantially equal to the half of said basic size a;
said building members further comprising additional disc members having diameters twice as large as said basic size a and central holes with diameters substantially as large as said basic diameter D, said additional disc members having a thickness substantially equal to said basic thickness v;
said building members further comprising semi-circular members with a diameter about twice said basic size a and with a thickness being substantially equal to said basic thickness v, each of said semi-circular members having at least one hole therewithin of a diameter equal to said basic diameter D;
said building members further comprising further elongated members having a common thickness substantially equal to said basic thickness v, said further elongated members having shapes similar to that of said elongated members but having a common width being substantially twice of said basic size a, said further elongated members having in their end regions respective throughgoing holes with diameters substantially equal to said basic diameter D, said holes having their center points on the longitudinal axes of said members at a distance from the outermost points of said region which is substantially equal to said basic size a; and
said basic size a being at least 25 mm.

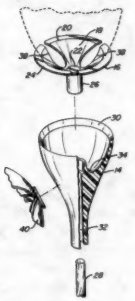
4,589,854

NESTED BALLOON HOLDER

Billie D. Smith, 2745 Waltrip La., Concord, Calif. 94518

Filed Nov. 16, 1984, Ser. No. 671,992
Int. Cl.[4] A63H *3/06*; G09F *21/06*
U.S. Cl. 446—223 **5 Claims**

1. A nested balloon holder, comprising
an outer balloon holder,
an inner balloon holder nested within said outer holder, and
a balloon stabilizing member positioned within said outer holder,
said inner balloon holder including
a general frusto-conical, funnel-like balloon anchoring member, said anchoring member having an upper perimeter, a lower perimeter, and balloon anchoring means,
a perimetrical rim extending from said upper perimeter of said anchoring member to facilitate efficacious finger-grasping of said inner holder during mounting and dismounting of said inner holder, and
a tubular member extending from said lower perimeter;
said outer balloon holder including
a generally frusto-conical, funnel-like member that is capable of securely receiving said inner holder in a nested fashion,



said frusto-conical, outer holder having an upper perimetrical rim, a tubular member, and a circular trough-like depression,
said upper perimetrical rim is positioned adjacent to said upper perimetrical rim of said inner holder,
said outer holder tubular member receives said tubular member of said inner holder, and
said circular depression, positioned radially from said outer holder tubular member, receives said balloon stabilizing member; and
said balloon stabilizing member, a toroidal weight member, is securely received in said circular depression of said outer holder so as to uniformly stabilize said nested balloon holder.

4,589,855

FORCED AIR-COOLED VEHICULAR-TYPE ALTERNATOR

Istvan Ragaly, Schwieberdingen, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

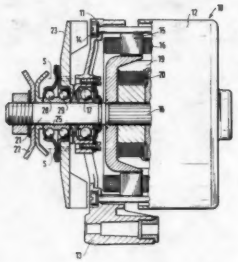
Filed Nov. 28, 1984, Ser. No. 675,511
Claims priority, application Fed. Rep. of Germany, Dec. 17, 1983, 3345661
The portion of the term of this patent subsequent to Jul. 31, 2001, has been disclaimed.
Int. Cl.[4] F16D *7/02*; H02K *7/18*
U.S. Cl. 464—36 **11 Claims**

1. Forced air-cooled vehicular-type alternator having
a frame (10, 11);
a main shaft (18, 21);
a bearing (17) secured in the frame and journalling the main shaft;
a drive wheel (22) secured to the shaft for coupling to an engine operating at speeds varying over a wide range;
a forced ventilation fan wheel (23) positioned concentrically with the shaft;
and a speed-dependent coupling for coupling the fan wheel for rotation with the shaft at low ranges of speed but permitting slippage of the shaft and fan wheel at high speeds of the shaft, including an inner bearing race (25) secured to the main shaft (18, 21) and having two running

grooves (26, 27) therein, and two parallel rows of balls (28, 29) rolling in the grooves,

comprising, in accordance with the invention,

a pair of outer races formed as ring-shaped elements (30, 31; 40, 41) of part-circular cross section surrounding opposite at least approximately quarter-circular zones of the balls (28, 29) and retaining the balls in the outer races;



a pair of disk-shaped membranes (34, 35; 44, 45), each holding a ring-shaped element (30, 31);

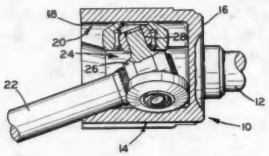
and means (S) for securing the disk-shaped membranes together and for resiliently biasing (F) the ring-shaped elements axially towards each other for exerting axial pressure on the balls (28, 29) rolling in the grooves, and restrained by the outer races.

4,589,856

TRIPOT UNIVERSAL JOINT OF THE END MOTION TYPE

Michael F. Mazziotti, and Philip J. Mazziotti, both of Toledo, Ohio, assignors to The Zeller Corporation, Defiance, Ohio

Filed Feb. 28, 1985, Ser. No. 706,670
Int. Cl.⁴ F16D *3/20*
U.S. Cl. 464—111 **9 Claims**



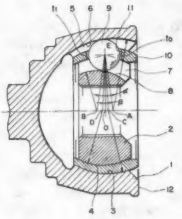
1. In a slidable universal joint of the end motion type having an outer cup-shaped member with an open end and a closed end, a plurality of axially-extending grooves positioned substantially parallel to one another and extending toward the closed end from the open end, a shaft having a spider affixed to an end portion thereof, said spider having a plurality of radially-extending trunnions, there being one for each of said grooves, a guide ring located on each of said trunnions for slidable movement therealong, each of said rings having an outer surface of segmental spherical shape, a plurality of bearings located around each of said rings, each of said bearings being of circular transverse cross section throughout its length and of diminishing diameter from outer end portions to a central portion, each of said bearings having a substantially cylindrical end portion beyond each of said outer end portions, the diameters of said outer end portions not exceeding the diameters of said substantially cylindrical end portions whereby the substantially cylindrical end portions of adjacent bearings can contact one another during operation of the universal joint, and a roller around each of said rings and said plurality of bearings and contacting and supporting peripheral surfaces of said bearings, said roller having means defining an inner annular groove with annular end shoulders adjacent ends of said substantially cylindrical end portions to aid in confining said bearings in said annular groove.

4,589,857

CONSTANT VELOCITY UNIVERSAL JOINT

Hideo Okoshi, Fujisawa, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan

Filed Feb. 6, 1985, Ser. No. 698,864
Claims priority, application Japan, Feb. 28, 1984, 59-35390
Int. Cl.⁴ F16D *3/23*
U.S. Cl. 464—145 **4 Claims**



1. A constant velocity universal joint comprising an outer member having an inner peripheral surface in the form of a partial concave spherical surface with a plurality of lengthwise grooves therein, an inner member inserted in said outer member and having an outer peripheral surface in the form of a partial convex spherical surface with a plurality of lengthwise grooves therein, a plurality of balls retained in corresponding opposed pairs of said grooves of said outer and inner members and serving to transmit a torque between said outer and inner members, and a cage receiving said balls and disposed between said inner and outer spherical surfaces of said outer and inner members, respectively, characterized in that the longitudinal cross-sections of the bottoms of the grooves of said outer member are arcuate and have a first arc center and the longitudinal cross-sections of the bottoms of the grooves of said inner member are arcuate and have a second arc center, with said first and second arc centers being offset to opposite sides of a central plane of said joint by substantially equal amounts, in that said inner and outer spherical surfaces have respective spherical centers offset to opposite sides of said central plane by substantially equal amounts, in that said cage has an outer part spherical surface with a spherical center substantially coincident with that of said inner spherical surface of said outer member and an inner part spherical surface with a spherical center substantially coincident with that of said outer spherical surface of said inner member, and in that the amount of offset of the first-mentioned spherical centers is smaller than the amount of offset of said arc centers, with the distance between said central plane of said joint and an opening end face of said outer member being greater than either of said amounts of offset.

4,589,858

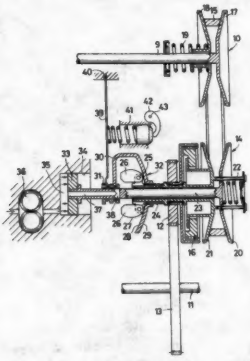
VARIABLE RATIO TRANSMISSION SYSTEM, PARTICULARLY USEFUL FOR VEHICLES

Bruno Gaddi, Pisa, Italy, assignor to Piaggio & C. S.p.A., Genoa, Italy

Filed Mar. 6, 1984, Ser. No. 586,682
Claims priority, application Italy, Sep. 9, 1983, 22839 A/83
Int. Cl.⁴ F16H *11/06*
U.S. Cl. 474—12 **10 Claims**

1. A transmission system for continuously varying the transmission ratio between a drive shaft and a driven shaft, comprising:

(a) an operating element arranged to vary the transmission ratio;
(b) a shank in communication with said driven shaft and mounted at one end to said operating element and at the other end to means for displacing said shank;
(c) a speed sensor mounted on said shank for measuring the angular speed of said shank;
(d) a bushing slidably mounted on said shank and means in



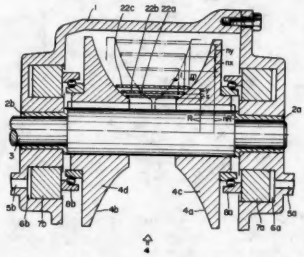
communication with said speed sensor for exerting a force on the bushing; and
(e) means for sensing the torque transmitted to said drive shaft and applying a force on a yieldable member whereupon said yieldable member provides force opposed to the force exerted on said bushing by said speed sensor so as to reposition said operating element to effect a transmission ratio change which maintains the rotational speed on said drive shaft substantially constant.

4,589,859

CONTINUOUSLY VARIABLE TRANSMISSION

Hiroshi Kanesaka, Kawasaki, Japan, assignor to Usui Kokusai Sangyo Kabushiki Kaisha, Shizuoka Prefecture and Kabushiki Kaisha Kanesaka Gijutsu Kenkyusho, Kawasaki, both of, Japan

Filed Oct. 5, 1984, Ser. No. 658,272
Claims priority, application Japan, Feb. 18, 1984, 28002
Int. Cl.[4] F16H *11/00, 7/02*
U.S. Cl. 474—148 **2 Claims**



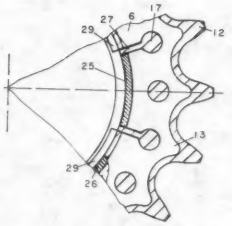
1. A continuously variable transmission comprising:
a drive pulley including a drive shaft rotable relative to a stationary body, and a pair of rotors mounted on the drive shaft and together rotable with the drive shaft, the rotors being spaced axially such that their opposed inner faces are formed with curves having gradients with respect to the central axis of the drive shaft increasing continuously in proportion to their radii;
a driven pulley including a driven shaft rotatable relative to the stationary body, and a pair of rotors mounted on the driven shaft and together rotatable with the driven shaft, the rotors being spaced axially such that their opposed inner faces are formed with curves having gradients with respect to the central axis of the driven shaft increasing continuously in proportion to their radii;
a tension pulley including an intermediate shaft fixed in the stationary body, and a pair of rotors mounted rotatably and axially movably by the intermediate shaft and spaced axially such that their opposed inner faces are formed with curves having gradients with respect to the central axis of the intermediate shaft increasing continuously in proportion to their radii;
a plurality of belts composed of thin bands running on the drive pulley, the driven pulley and the tension pulley such that the respective belt edges are in contact with the respective curved faces of the drive, driven and tension pulleys; and
means for varying the distance between the respective curved faces of the drive and driven pulleys,
whereby the rotating speed ratio between the drive and driven pulleys can be varied by varying the contact radii of the belts with the drive and driven pulleys while imparting substantially uniform tension to the belts, respectively, by the tension pulley.

4,589,860

GEAR AND METHOD FOR MAKING THE SAME

Manfred Brandenstein, Eussenheim; Roland Haas, Hofheim; Gerhard Herrmann, Schweinfurt; Herbert Dobhan, Bergrheinfeld, and Rüdiger Hans, Niederwerrn, all of Fed. Rep. of Germany, assignors to SKF Kugellagerfabriken GmbH, Fed. Rep. of Germany

Filed May 31, 1984, Ser. No. 615,779
Claims priority, application Fed. Rep. of Germany, Jun. 25, 1983, 3322907
Int. Cl.[4] F16H *55/06, 55/30, 55/17, 55/12*
U.S. Cl. 474—161 **6 Claims**



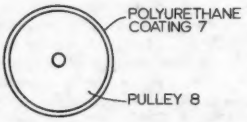
1. Gear for chain drives comprising a gear body made of a cast plastic material having a hub section, a gear rim section consisting of a plurality of circumferentially spaced spur teeth and a web section joining the hub and gear rim sections, a ring plate having a radial annular section completely embedded in the gear body and collar sections at the inner periphery of the radial annular section defining mounting means for the gear, the radial annular section of said ring plate **6** having at its outer radial edge **10**, radially outwardly directed projections **13**, which are located in each case in a tooth **12**, and which are embedded in the casting material of the gear body **5**, said projections extending beyond the bottom of the spaces **11** between adjacent spur teeth **12**, and an axial opening **17** formed in the ring plate **6** adjacent each projection **13** and radially below it, said ring plate **6** having one or more axial slots **27** extending radially inwardly, starting in each case from one of the axial openings **17**.

4,589,861

SIMPLE RECORDING HEAD DRIVE HAVING VIRTUALLY ZERO BACKLASH OR SLIPPAGE

Dennis W. Dodge, Amherst, N.H., assignor to Itek Graphix Corp., Lexington, Mass.

Filed May 22, 1984, Ser. No. 612,770
Int. Cl.[4] F16H *55/48*
U.S. Cl. 474—178 13 Claims



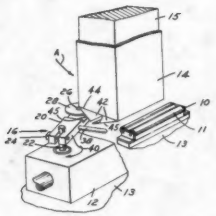
9. The method of forming a drive pulley; comprising:
(a) forming a pulley with a predetermined substantially nmon-deformable drive surface;
(b) applying a coating of elastomer of predetermined thickness to said pulley drive surface;
(c) said predetermined thickness of said elastomer coating being less than 0.0100 inches.

4,589,862

APPARATUS FOR FOLDING AND TUCKING A CONTAINER CLOSURE

Howard E. Murrah, Fenton, Mich., assignor to Ex-Cell-O Corporation, Troy, Mich.

Filed Jul. 8, 1985, Ser. No. 752,431
Int. Cl.[4] B31B *1/32*
U.S. Cl. 493—183 5 Claims



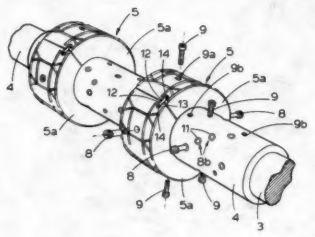
1. A tucking and folding mechanism for closing a downwardly extending trailing end panel of a vertically oriented heat-activated, plastic coated tubular paperboard carton being carried therepast, said mechanism comprising a drive assembly, a pair of oppositely rotating shafts mounted adjacent opposite ends of said drive assembly, an arm secured at one end thereof to each of said shafts for rotation therewith, a pivot pin mounted adjacent the distal end of each of said arms, and a roller freely rotatably mounted on each of said pivot pins adapted to engage said trailing end panel upon the timed rotation of said shafts to thereby rotate on said pivot pin while folding said end panel from a vertical to a horizontal position, minimizing any relative movement between said end panel and said roller to thereby prevent scuffing or marring of said panel.

4,589,863

CYLINDER FOR A ROTARY WEB PROCESSING MACHINE

William D. Hodges, London, England, assignor to Machines Chambon S.A., Orleans, France

Filed Apr. 23, 1984, Ser. No. 603,202
Claims priority, application United Kingdom, Apr. 28, 1983, 8311566
Int. Cl.[4] B31B *47/00*
U.S. Cl. 493—471 9 Claims



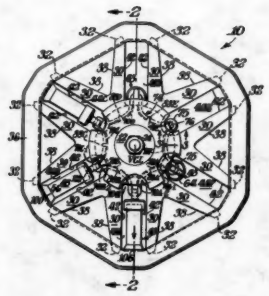
1. A cylinder for a rotary web processing machine, the cylinder comprising a mandrel and a plurality of multi-part rings detachably fixed thereto, wherein each part of each ring is fixed to the mandrel by first and second screws, each first screw clamping the associated ring part to the mandrel and locating that ring part both radially and axially, each second screw clamping the associated ring part to the mandrel, wherein each of the rings is of two-part construction, each of said parts being a half ring.

4,589,864

CENTRIFUGE ROTOR HAVING A RESILIENT TRUNNION

Paul M. Cole, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Nov. 5, 1984, Ser. No. 668,420
Int. Cl.[4] B04B *5/02*
U.S. Cl. 494—20 38 Claims



1. A swinging bucket centrifuge rotor for supporting a sample container having a hooked end through angular rotation from a first position in which the axis of the sample container lies substantially parallel to the rotor axis of rotation to a second position in which the axis of the container lies substantially perpendicularly thereto, the rotor comprising:
a central hub connectable to a source of motive energy; and,
a looped member mounted to the hub, the looped member having an opening therein sized to receive the hooked end of the container and support the same for movement from the first to the second position, the opening defined by the

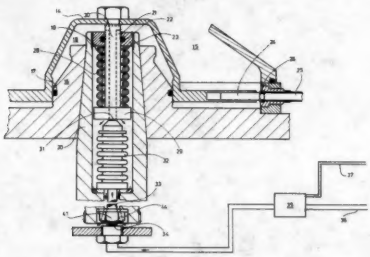
looped member lying in a plane that defines a predetermined angle with respect to the axis of rotation when the container is in the second position.

4,589,865

CENTRIFUGAL SEPARATOR WITH CENTRAL SLUDGE DISCHARGE

Per Gullers, Södertälje, Sweden, assignor to Alfa-Laval AB, Tumba, Sweden

Filed Mar. 8, 1984, Ser. No. 587,516
Claims priority, application Sweden, Mar. 16, 1983, 8301427
Int. Cl.[4] B04B *11/00, 11/08*
U.S. Cl. 494—26 **7 Claims**



1. A centrifugal separator comprising a rotor mounted for rotation about an axis, the rotor having an outer wall surrounding a sludge space situated at the periphery of the rotor and also having a sludge receiving chamber, means forming sludge channels extending from said sludge space radially inwards to said sludge receiving chamber, said channels having openings leading into said chamber, means for discharging sludge from said chamber, an axially movable slide member for controlling said channel openings, spring means arranged between said slide member and the rotor and operable to actuate the slide member in one axial direction, the rotor having a pressure chamber located between said slide member and the rotor and sealed from said sludge receiving chamber, the radially outer part of said pressure chamber being spaced a substantial distance radially inward from said outer wall of the rotor, the rotor also having a fluid channel and a cavity, a pressurized fluid source situated outside the rotor and connectable through said fluid channel to said pressure chamber to actuate the slide member through a displacement range in the other axial direction, and a position regulator located in said cavity and operable directly on the slide member under control of fluid from said fluid channel to hold the slide member in different positions within said displacement range.

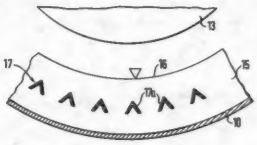
4,589,866

DECANTER-TYPE CENTRIFUGE

Werner Stahl, Stalbuehlweg 8, D-6740 Landau, Fed. Rep. of Germany

Filed Oct. 26, 1982, Ser. No. 436,697
Claims priority, application Fed. Rep. of Germany, Oct. 28, 1981, 3142805
Int. Cl.[4] B04B *1/20*
U.S. Cl. 494—54 **12 Claims**

1. Decanter-type centrifuge separating apparatus, particularly of the countercurrent type, said apparatus comprising a rotatably mounted fully enclosed barrel, a transporting screw-type rotor rotating at a speed differing from the speed of barrel rotation, a structure extending parallel to the longitudinal axis of the barrel and mounted between the flights of the transporting screw to rotate with the transporting screw at a pre-determinable distance from the inner surface of the barrel to form flow obstacles greatly reducing the velocity of liquid flow in the area between said structure and the barrel, with the distance between the radially outer extremities of said structure and the inner surface of the barrel being such that transport of



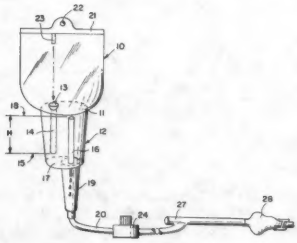
the sediment the flights compact into a solids cake remains unhindered.

4,589,867

EXPONENTIAL MIXING AND DELIVERY SYSTEM

Michael B. Israel, 29 Gann Rd., East Hampton, N.Y. 11937

Filed Nov. 16, 1984, Ser. No. 671,965
Int. Cl.[4] A61M *5/00*
U.S. Cl. 604—85 **13 Claims**



1. A non-vented, gravity fed exponential mixing and delivery system for the administration of a therapeutic agent in a precalculated manner to give constant therapeutic blood plasma levels in the recipient which comprises

an upper sealed deformable container for containing a dilute solution of a therapeutic agent, provided with a hanging means,

a removable internal closure means within said upper container for initiating the gravity flow of the dilute solution into a lower mixing container,

a lower nondeformable mixing container integral with the upper container for containing a concentrated solution of said agent,

a common access means between the upper and lower containers for the flow of solution from the upper container into a vertical inlet conduit means extending into the lower mixing container,

a vertical outlet conduit means extending upwardly into the lower mixing container to provide a height differential between inlet and outlet conduit means for the exponential mixing of the dilute and concentrated solutions,

said vertical outlet tube also extending downwardly into a minidrip chamber for the flow of exponentially dicreasing concentrations of said therapeutic agent at a constant infusion rate and at a regulated flow rate to the patient.

4,589,868

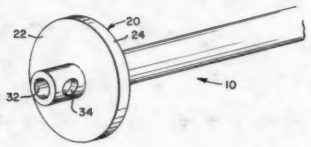
EXPANDABLE DILATOR-CATHETER

Stephen P. Dretler, 172 Cochituate Rd., Wayland, Mass. 01778

Filed Mar. 12, 1984, Ser. No. 588,282
Int. Cl.[4] A61M *25/00*
U.S. Cl. 604—96 **12 Claims**

1. A dilator-catheter comprising an elongated expandable tube for insertion into a body cavity, said tube having distal

and proximal ends wherein the length of said tube is such that said distal end is disposed within a body cavity and the proximal end is disposed outside said body, said tube having an exterior wall and an interior wall in spaced relationship to one another thereby forming an annular space therebetween, expandable retaining means disposed near said distal end of said



tube, said retaining means being defined by a portion of said exterior wall having substantially opposing side walls connected by an annular ring, said retaining means being formed by the expansion of said portion of said exterior wall of said tube, and means for providing fluid to said annular space for expanding said tube and said retaining means.

4,589,869

SUCTION DEVICE AND A METHOD OF MANUFACTURING THE SAME

Rune Wernborg, Kållered, Sweden, assignor to Mediplast AB, Solna, Sweden

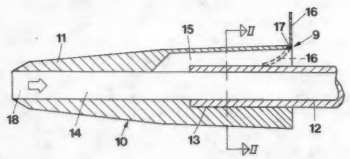
PCT No. PCT/SE83/00061, § 371 Date Oct. 13, 1983, § 102(e) Date Oct. 13, 1983, PCT Pub. No. WO83/02900, PCT Pub. Date Sep. 1, 1983

PCT Filed Feb. 23, 1983, Ser. No. 552,133

Claims priority, application Sweden, Feb. 24, 1982, 8201137

Int. Cl.[4] A61M *1/00*

U.S. Cl. 604—119 **7 Claims**



1. A valve device for use in surgical suction instruments for one-time use comprising a suction channel which passes through the device and a shunt conduit which communicates the suction channel with the exterior of the device, the device being formed by at least two parts which are connected together by means of an overlap connection with one of the parts being provided on an end portion with at least one resilient lip means projecting therefrom and connected to said one part by a portion of thinner material forming a hinge, said lip means being limited in its movement by the other part, such that it is in the shunt and in an abutting position across the shunt conduit opening to the suction channel, the lip means being adapted to block the passage of air in the direction from the suction channel to the exterior and opening when the suction channel is blocked.

4,589,870

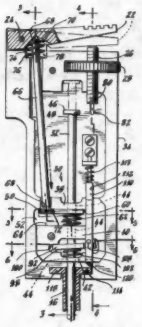
INCREMENTAL ACTUATOR FOR SYRINGE

Paul S. Citrin, Danbury, and Nelson F. Murcko, Stratford, both of Conn., assignors to Indicon, Inc., Brookfield, Conn.

Filed Feb. 21, 1984, Ser. No. 581,801

Int. Cl.[4] A61M *5/315*

U.S. Cl. 604—210 **13 Claims**



1. A manually operated actuator for a prefilled syringe containing a piston which is to be incrementally moved comprising:

a housing;

an elongated rod mounted to the housing for movement along the longitudinal axis of the rod between a retracted and an extended position outside the housing and for effectively engaging the piston to move it within the syringe;

means for imparting incremental motion to the rod along its longitudinal axis;

said housing having a means for receiving and retaining a portion of said syringe with its piston in alignment with the rod so that movement of the rod will cause movement of the piston,

back-up inhibitor means extending from said retaining means to said rod for operatively engaging the rod when a said syringe portion is held by the retaining means and disengaging from said rod in the absence of a said syringe portion from said retaining means so that said syringe piston can be brought into operative contact with the rod without movement of the piston until the syringe portion is held by the retaining means.

4,589,871

SYRINGE BARREL

Claude Imbert, La Tronche, France, assignor to Becton, Dickinson and Company, Paramus, N.J.

Filed Mar. 29, 1985, Ser. No. 717,748

Int. Cl.[4] A61M *5/325*

U.S. Cl. 604—240 **16 Claims**

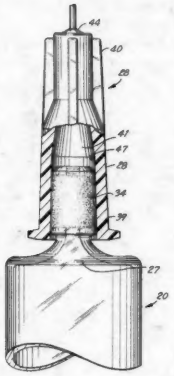
1. A syringe barrel comprising:

an elongate barrel portion having a chamber for retaining fluid;

a tip extending from a distal end of said barrel portion having a passageway therethrough communicating with said chamber; and

an applied coating on said tip for increasing the roughness of said tip so that the force required to remove a fluid trans-

fer apparatus removably connected to said tip by a frictional interference fit is greater than the force required to



remove the fluid transfer apparatus from an identically sized tip without said coating.

4,589,872

QUICK ACTION FLOW REGULATOR FOR MEDICAL APPARATUS

Matthew E. Bellin, Burnsville, Minn., and Joseph A. Marino, Jr., Apple Valley, both of Minn.

Filed Feb. 19, 1985, Ser. No. 703,225
Int. Cl.[4] A61M *5/005*
U.S. Cl. 604—246 **11 Claims**

1. For use in restricting the flow of fluid in medical apparatus,

a valve body having inlet and outlet openings and a valve seat therebetween, said valve body having a female threaded portion displaced from said inlet and outlet openings;

a valve stem having external threads threadedly engaging the female threaded portion and having a valve member secured thereto and cooperating with a valve seat to control flow between said inlet and outlet openings, the position of said valve member with respect to said valve seat being normally varied by adjusting the threaded engagement between the valve stem and the threaded portion of the valve body;

said female threaded portion having a fixed portion and a yieldable threaded portion so that the position of the valve member can be rapidly changed in either direction by exerting pressure on the valve stem to force the yieldable threaded portion outwardly to enable the threads of the male portion to pass over the threads of the female portion; and

sealing means disposed between the threaded portion of the valve body and the inlet and outlet openings to seal against the escape of fluid through said female threaded portion.

4,589,873

METHOD OF APPLYING A HYDROPHILIC COATING TO A POLYMERIC SUBSTRATE AND ARTICLES PREPARED THEREBY

Abraham Schwartz; Jane Graper, both of Durham, and Joel Williams, Cary, all of N.C., assignors to Becton, Dickinson and Company, Paramus, N.J.

Filed May 29, 1984, Ser. No. 614,620
Int. Cl.[4] A61M *25/00*; A41D *19/00*
U.S. Cl. 604—265 **13 Claims**

10. An article consisting of a polymeric substrate selected from the group of substrates consisting of polyvinyl chloride, polyethylene, polypropylene, polytetrafluoroethylene, polyurethane and latex rubber having a coating of polyvinyl pyrrolidone directly on said substrate whereby the surface of said substrate having said polyvinyl pyrrolidone coating and the surface of said substrate without said coating have substantially the same surface coefficient of friction when dry, but the surface of said substrate having said polyvinyl pyrrolidone coating when wet has a coefficient of friction which is lower than the coefficient of friction of said surface of said substrate without said coating when wet.

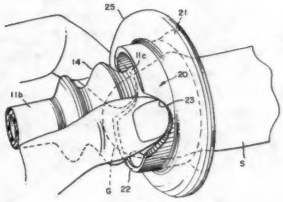
11. The article of claim **10** which is a polyvinyl chloride catheter and having a coefficient of friction when wet of about 0.1 to 0.3.

4,589,874

EXTERNAL MALE CATHETER AND APPLICATOR COLLAR THEREFOR

Kenneth E. Riedel, Naperville, and David L. Doerschner, Rolling Meadows, both of Ill., assignors to Hollister Incorporated, Libertyville, Ill.

Filed Mar. 21, 1985, Ser. No. 714,716
Int. Cl.[4] A61F *5/44*
U.S. Cl. 604—349 **13 Claims**



1. An external catheter and applicator combination, said catheter comprising a sheath of thin, stretchable, elastic material having a generally cylindrical section merging in one end with a tapered neck section terminating in an outlet section of reduced diameter, and an inner sleeve having a proximal end merging with the distal end of said cylindrical section and an elongated tapered distal portion extending into said neck section and terminating in a distal opening spaced from said outlet section; said applicator comprising a relatively rigid and generally cylindrical collar having open proximal and distal ends and an external annular bead with smoothly rounded surfaces at its proximal end; said catheter having its neck section extending through said collar, its outlet section projecting axially from the distal end of said collar, its cylindrical section rolled into a torus extending about said collar adjacent said bead, and its inner sleeve extending from said torus over said bead and radially inwardly at the proximal end of said collar; the radially inwardly extending portion of said inner sleeve being in stretched condition and generally disposed in a plane normal to

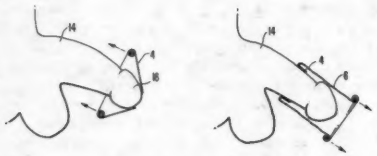
the axis of said collar; said torus in an unstretched state having an inner diameter smaller than the outside diameter of said bead, whereby, said bead retains said torus on said collar until an unrolling force is exerted on said torus of sufficient magnitude to expand the inside diameter thereof.

4,589,875

METHOD OF APPLYING A MALE INCONTINENCE DEVICE

Leonard C. Stringer, 3907 Goodnight Ave., Pueblo, Colo. 81005

Filed May 24, 1983, Ser. No. 497,593
Int. Cl.[4] A61F *5/44*
U.S. Cl. 604—351 4 Claims



1. A method for applying a catheter for directing urine from a male patient comprising

(a) providing a sheath means of a thin, flexible material and comprising a cylindrical section of a first diameter extending along a major part of the length of said sheath means and a first end section having a second diameter smaller than said first diameter at one end of said cylindrical section,

(b) pushing said first end section over the glans penis of said patient whereby said first end section engages the base of said penis, and

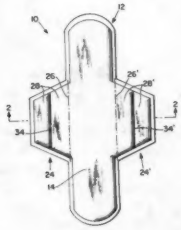
(c) folding said cylindrical section back over said said first end section so that a first portion of said cylindrical section forming a urine seal is in contact with said first end section and extending a second portion beyond said glans penis by a distance sufficient to form a surge chamber for collection of urine from said patient.

4,589,876

SANITARY NAPKIN

Kees J. Van Tilburg, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Continuation-in-part of Ser. No. 511,118, Jul. 5, 1983. This application Mar. 20, 1984, Ser. No. 591,621
Int. Cl.[4] A61F *13/16*
U.S. Cl. 604—385 R 15 Claims



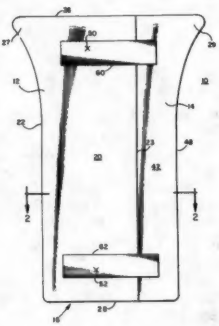
1. A sanitary napkin that is sized and configured to be worn in a user's panties which panties are so sized and configured that the crotch edge portions can be positioned in the user's groins while the crotch region of the panties noncompressively cover the user's labia majoria, said sanitary napkin comprising a longitudinally elongate absorbent core, a liquid barrier backsheet, and a pair of flexible side flaps, said core being sized and configured to only span across the distal surfaces of the user's labia majoria, and said flaps being sufficiently flexible and sized and configured to be so disposed in a user's panties that proximal portions of said flaps extend upwardly to the user's groins and cover the laterally outwardly facing surface areas of the user's labia majoria, and so that distal portions of said flaps extend downwardly from said user's groins and are disposed intermediate edge portions of said crotch region of the user's panties and areas of the user's inner thigh regions.

4,589,877

MALE INCONTINENCE DEVICE

Daniel M. Sivilich, Freehold Township, Monmouth County, N.J., assignor to E. R. Squibb & Sons, Inc., Princeton, N.J.

Continuation-in-part of Ser. No. 644,610, Aug. 27, 1984, abandoned. This application Jun. 27, 1985, Ser. No. 749,598
Int. Cl.[4] A61F *13/16*
U.S. Cl. 604—385 R 30 Claims



1. A male incontinence shield for use with a user's undergarment comprising:

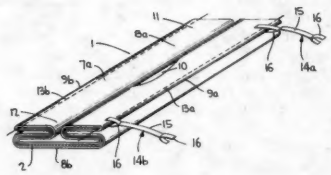
inner and outer moisture absorbent pad portions coupled together at opposite ends and partially overlapping one another to form a penile opening.

4,589,878

DISPOSABLE DIAPER

Sem Mitrani, Ris Orangis, France, assignor to Beghin-Say S.A., Thumeries, France

Filed Mar. 27, 1984, Ser. No. 593,920
Claims priority, application France, Mar. 29, 1983, 83 05123
Int. Cl.[4] A61F *13/16*
U.S. Cl. 604—392 4 Claims



1. A disposable diaper, in particular for incontinent adults, comprising an absorbing, flat pad of rectangular shape and covered on its outside by an impermeable sheet and on its inside which will make contact with the user's skin by a nonwoven permeable sheet, said diaper being provided along a longitudinal axis with a rear zone and a front zone, characterized in that strings are provided near each of the longitudinal edges and along their entire length, in that prior to use a first

elastic belt provided with a fastener at each end is fastened in the rear zone a first longitudinal edge so as to fasten the string of said edge, a second similar elastic belt provided with a fastener at each end is fastened to said first longitudinal edge in the front zone so that the fastener of the second belt also fastens the string to said edge whereby, in use, said first and second belt are fastened to the second longitudinal edge, respectively, in the rear zone and in the front zone so as to fasten the string of said second longitudinal edge.

4,589,879

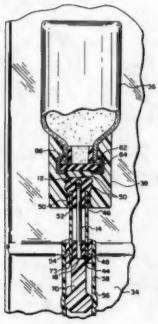
CANNULA ASSEMBLY HAVING CLOSED, PRESSURE-REMOVABLE PIERCING TIP

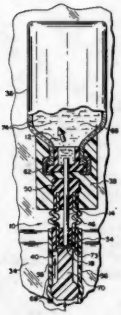
Stephen Pearson, Ingleside, Ill., assignor to Baxter Travenol Laboratories, Inc., Deerfield, Ill.

Filed Nov. 4, 1983, Ser. No. 548,796

Int. Cl.[4] A61B *19/00*; A61M *5/32, 37/00*

U.S. Cl. 604—411 **12 Claims**





1. A cannula assembly comprising:

(a) a hollow shank having first and second ends;

(b) a piercing tip for piercing a barrier, removably mounted in and closing off said first shank end, said piercing tip including

(i) a substantially conical shaped portion having a base and

(ii) a substantially cylindrical portion extending from said base, wherein the diameter of said cylindrical portion is less than the diameter of said base;

(c) said second shank end adapted for the introduction of a fluid into said shank at a pressure high enough to disengage and thereby operatively disassociate said piercing tip from the remainder of said cannula assembly and to force said piercing tip out of said first shank end, said cannula assembly virtually preventing the collection of barrier material inside said hollow shank.

4,589,880

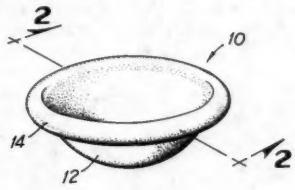
DISPOSABLE SPERMICIDE-RELEASING DIAPHRAGM

Richard L. Dunn; Richard N. Terry; Donald R. Cowsar, and Robert A. Casper, all of Birmingham, Ala., assignors to Southern Research Institute, Birmingham, Ala.

Filed Jul. 14, 1983, Ser. No. 513,773

Int. Cl.[4] A61K *9/22*; A61F *2/66, 5/46*

U.S. Cl. 604—892 **20 Claims**



1. A disposable, spermicide-releasing intravaginal contraceptive device comprising an imperforate, flexible barrier portion having resilient means at an outer periphery, said device formed from a homogeneous blend of effective amounts of a thermoplastic elastomer having an average Shore A hardness of from 40 to 90 and a spermicide whereby, when said device is positioned within the vagina, said spermicide is released by diffusin into the vagina at a controled rate to provide effective spermicidal action for a predetermined amount of time, said device having a first-order release of said spermicide.

4,589,881

POLYPEPTIDE

Michael D. Pierschbacher, San Diego, and Erkki I. Ruoslahti, Olivenhain, both of Calif., assignors to La Jolla Cancer Research Foundation, La Jolla, Calif.

Continuation-in-part of Ser. No. 405,239, Aug. 4, 1982, Pat. No. 4,517,686, and a continuation-in-part of Ser. No. 433,457, Oct. 8, 1982, abandoned. This application Jul. 28, 1983, Ser. No. 518,036

Int. Cl.[4] A61F *1/00*; A61K *37/00*; C07C *103/52*; C07G *7/00*

U.S. Cl. 623—11 **11 Claims**

PEPTIDE I

ILE-GLY-GLN-GLN-SER-THR-VAL-SER-ASP-VAL-PRO-ARG-ASP-LEU-GLU-VAL-VAL-ALA-ALA-THR-PRO-THR-SER-LEU-LEU-ILE-SER-TRP-ARG-CYS

PEPTIDE II

SER-TRP-ARG-ALA-PRO-ALA-VAL-THR-VAL-ARG-TYR-TYR-ARG-ILE-THR-TYR-GLY-GLU-THR-GLY-GLY-ASN-SER-PRO-VAL-GLN-GLU-PHE-THR-VAL-CYS

PEPTIDE III

PHE-THR-VAL-PRO-GLY-SER-LYS-SER-THR-ALA-THR-ILE-SER-GLY-LEU-LYS-PRO-GLY-VAL-ASP-TYR-THR-ILE-THR-VAL-TYR-ALA-VAL-THR-CYS

PEPTIDE IV

TYR-ALA-VAL-THR-GLY-ARG-GLY-ASP-SER-PRO-ALA-SER-SER-LYS-PRO-ILE-SER-ILE-ASN-TYR-ARG-THR-GLU-ILE-ASP-LYS-PRO-SER-GLN-MET-CYS

1. The biologically active amino acid polymer consisting essentially of the polypeptide: Tyr-Ala-Val-Thr-Gly-Arg-Gly-Asp-Ser-Pro-Ala-Ser-Ser-Lys-Pro-Ile-Ser-Ile-Asn-Tyr-Arg-Thr-Glu-Ile-Asp-Lys-Pro-Ser-Gln-Met-R-OH.

4,589,882

ENZYMATICALLY CROSSLINKED BIOELASTOMERS

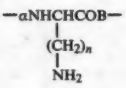
Dan W. Urry, c/o Lab. of Molecular Biophysics University of Alabama in Birmingham University Station, P.O. Box 311, Birmingham, Ala. 35294

Filed Sep. 19, 1983, Ser. No. 533,524
Int. Cl.[4] A61F *2/02, 2/06;* A61K *37/00*
U.S. Cl. 623—11 30 Claims

1. A synthetic elastomeric copolymer, which comprises:

an elastomeric component selected, from the group consisting of tetrapeptide repeating units, pentapeptide repeating units and mixtures thereof wherein said repeating units comprise amino acid residues selected from the group consisting of hydrophobic amino acid and glycine residues and said repeating units exist in a conformation having a β-turn, and

a crosslinking component selected from the group consisting of amino acid or peptide residues of the formula



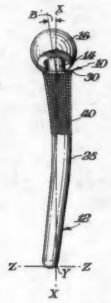
wherein α represents a covalent bond or a peptide fragment containing 1–10 α-helix-forming amino acid residues, B represents a covalent bond or a peptide fragment containing 1–10 amino acid residues, and n is an integer from 2 to 6.

4,589,883

FEMORAL HIP PROSTHESIS

Robert V. Kenna, Hackensack, N.J., assignor to Pfizer Hospital Products Group, Inc., New York, N.Y.

Filed Jun. 6, 1983, Ser. No. 501,215
Int. Cl.[4] A61F *1/05*
U.S. Cl. 623—22 14 Claims



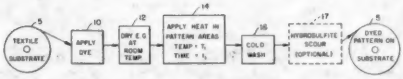
1. A femoral hip prosthesis comprising a stem component with an anterior face, a posterior face, a lateral face and a medial face and having a proximal portion and a substantially longer distal portion, the stem being noncircular in cross section and exhibiting a slight posterior bow along its length, the stem further including a twist of from about 5° to 15° in the proximal portion, the twist extending in a direction from the anterior to the posterior face about the longitudinal axis of the stem, thereby providing a more accurate fit between the stem and an intramedullary cavity and positive resistance to rotation of the stem within the cavity.

4,589,884

PROCESS FOR HEAT TREATING TEXTILE SUBSTRATES TO GIVE COLORED PATTERN

Michael W. Gilpatrick, Chesnee, S.C., assignor to Milliken Research Corporation, Spartanburg, S.C.

Continuation of Ser. No. 476,829, Mar. 18, 1983, abandoned.
This application Apr. 10, 1985, Ser. No. 721,501
Int. Cl.[4] D06P 5/00
U.S. Cl. 8—481 25 Claims



1. A method for dyeing the surface of a thermoplastic textile substrate in areas defining a desired pattern configuration comprising the steps of:

(a) applying, substantially uniformly, a heat fixable dye material to said substrate surface without fixing said dye; and

(b) applying heat selectively to said substrate surface in said areas defining said desired pattern configuration, said heat being sufficient to fix at least a portion of said dye material in said areas, while dye material applied to said substrate surface outside said areas is maintained outside said areas in substantially unfixed condition and unchanged distribution.

4,589,885

LIQUID REACTIVE DYESTUFF FORMULATIONS AND THEIR USE

Konrad Opitz, Liederbach, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Filed Nov. 21, 1984, Ser. No. 673,860
Claims priority, application Fed. Rep. of Germany, Nov. 24, 1983, 3342432
Int. Cl.[4] C09B 67/00, 67/24
U.S. Cl. 8—527 4 Claims

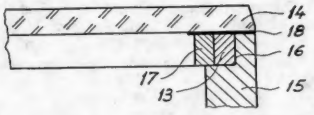
1. A liquid, water-containing dyeing formulation of a reactive dyestuff, which contains 10–50% by weight of C.I. Reactive Blue 19, 5–50% by weight of one or more anionic dispersants from the group of the ligninsulfonates or from the group of the condensation products of formaldehyde with naphthalenesulfonic acid or with a naphthalenesulfonic acid which is substituted by 1–3 lower alkyl groups, 1–30% by weight of the sodium salt of anthraquinone-2-sulfonic acid, 1–6% by weight of an alkalimetal salt of phosphoric acid or of a mixture of sodium acetate/acetic acid as buffer substances, and 38–83% by weight of water.

4,589,886

METHOD OF MAKING PART OF A WATCH CASE

Paul Gogniat, and Eric Loth, both of Bienne, Switzerland, assignors to Montres Rado S.A., Longeau, Switzerland

Filed Dec. 5, 1983, Ser. No. 557,917
Claims priority, application Switzerland, Dec. 14, 1982, 7262/82
The portion of the term of this patent subsequent to Feb. 28, 2001, has been disclaimed.
Int. Cl.[4] B23P 13/00
U.S. Cl. 29—179 8 Claims



1. A method of providing a substantially flat glass for a watch case with means for fastening said glass to another part of the watch case, which comprises the steps of:

(a) depositing a metal coating on at least one peripheral portion of the glass; and

(b) moulding on the coating a molten metal material having an affinity for the metal of the coating to form said fastening means.

4,589,887

FUEL BRIQUETTES AND METHOD OF MAKING

Knud E. H. Aunsholt, Roskilde, Denmark, assignor to Kryolitselskabet Oresund A/S, Copenhagen, Denmark

Filed Apr. 29, 1985, Ser. No. 728,583
Claims priority, application Denmark, May 4, 1984, 2224/84
Int. Cl.[4] C10L 5/12
U.S. Cl. 44—16 R 9 Claims

1. In fuel briquettes made on the basis of solid combustible organic material and containing a solid, combustible binder originating from fly ash, the improvement that the binder is fly ash coke in an amount of 3% to 50% by weight of the briquettes and that the solid combustible organic material excludes anthracite, pit coal and lignite.

3. In a method for preparing fuel briquettes based on a solid organic combustible material which is admixed with a binder originating from fly ash and is thereupon pressed to form briquettes under pressure and elevated temperature in a briquette press in a manner known per se, the improvement consisting in using fly ash coke as the binder in an amount of 3% to 50%, calculated on the weight of the finished briquettes and in using solid organic combustible material from which anthracite, pit coal and lignite have been excluded.

4,589,888

PRESSURE SWING ADSORPTION PROCESS

Willis E. Hiscock, Norwalk, Conn.; Robert T. Cassidy, Waldwick, N.J., and Robert G. Werner, Danbury, Conn., assignors to Union Carbide Corporation, Danbury, Conn.

Filed Oct. 5, 1984, Ser. No. 658,306
Int. Cl.[4] B01D 53/04
U.S. Cl. 55—26 26 Claims

1. In a pressure swing adsorption process for the separation and recovery of a less readily adsorbable component of a feed gas mixture in an adsorption system capable of selectively adsorbing a more readily adsorbable component from said gas mixture, the adsorption system containing at least four adsorbent beds, each of which undergoes, on a cyclic basis, a processing sequence that includes (1) adsorption at an upper adsorption pressure level with discharge of the less readily adsorbable component as product effluent from the product end of the bed, (2) cocurrent depressurization with release of void space gas from the product end of the bed and the passage of said gas to other beds in the system initially for pressure equalization and then for provide purge purposes, (3) countercurrent depressurization to lower adsorption pressure with release of said more readily adsorbable component from the feed end of the bed, (4) purge at said lower desorption pressure, (5) partial repressurization by pressure equalization with void space gas from other beds, and (6) repressurization to upper adsorption pressure, the improvement comprising:

(a) passing void space gas released from the product end of the bed during cocurrent depressurization from said upper adsorption pressure to an upper intermediate pressure to one other bed in the system being partially repressurized to said upper intermediate pressure, while simultaneously passing said void space gas to a second other bed as purge gas for said other bed at its lower desorption pressure level;

(b) discontinuing the passage of said void space gas to said partially repressurized bed upon said bed being depressurized and said partially repressurized bed reaching said upper intermediate pressure;

(c) further continuing to pass void space gas released from

said bed being depressurized solely to said second other bed as purge gas, after completion of step (a), said bed being depressurized thereby being depressurized further from said upper intermediate pressure to an intermediate pressure level;

(d) passing additional void space gas released from the product end of the bed being depressurized upon further cocurrent depressurization thereof from said intermediate pressure to another bed in the system initially at a lower pressure for pressure equalization therebetween at said lower intermediate pressure, while simultaneously countercurrently depressurizing said bed by the discharge of gas from the feed end of the bed;

(e) discontinuing the passage of said void space gas to said bed initially at lower pressure upon said bed being depressurized and said bed initially at lower pressure reaching said lower intermediate pressure; and

(f) further continuing to countercurrently depressurize said bed being depressurized after completion of said step (d) down to the lower desorption pressure of said bed, whereby enhanced adsorbent productivity, bed capacity and product recovery can be obtained at minimized overall cycle times without degradation of product effluent purity.

4,589,889

METHOD AND APPARATUS FOR THE REMOVAL OF NOXIOUS ACIDIC GASES FROM A HOT EXHAUST GAS STREAM

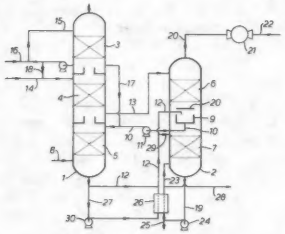
Peter Spencer, 9 Links Close, Ashstead, Surrey, England

Continuation of Ser. No. 595,262, Mar. 30, 1984, abandoned. This application May 31, 1985, Ser. No. 739,625

Claims priority, application United Kingdom, Mar. 31, 1983, 8308952

Int. Cl.[4] B01D *53/14*

U.S. Cl. 55—48 **6 Claims**



1. The method for stripping sulphur oxides from hot flue gases including the steps of providing an absorption chamber and a vertical stripping chamber, operating the absorption chamber at or above atmospheric pressure, operating the stripping chamber substantially below atmospheric pressure, introducing hot flue gases containing sulphur oxide into one end of the absorption chamber as the sole source of thermal energy for both chambers, introducing cool water adjacent the opposite end of the absorption chamber, passing the gases in counter current flow and heat exchange contact with the cool water to cool the gases and absorb the sulphur oxides, collecting the sulphur oxide containing water intermediate the ends of the absorption chamber to form a first stream, introducing said first stream into the upper portion of the stripper chamber; withdrawing a second stream of heated water having sulphur oxides dissolved therein from the one end of said absorption chamber and releasing the stream into a flash zone within and intermediate the ends of the stripper chamber and by virtue of the pressure differential between the chambers flashing the stream as it enters the stripper chamber to absorb thermal energy from the contents of the stripping chamber, passing the flashed vapors of the second stream in counter current flow and heat exchange contact with the first stream to cause the first stream to release its sulphur oxides; collecting the condensate from the flashing of the second stream, causing the water of the first stream to by-pass the collected condensate and pass to the bottom of the stripper chamber, increasing the pressure of the collected condensate sufficiently to recycle it as a cooling and sulphur oxide absorbing stream into the hot gases in the absorption chamber, withdrawing the separated sulphur oxides from the top of the stripper chamber and the water free of sulphur oxides from the bottom of the stripper chamber.

4,589,890

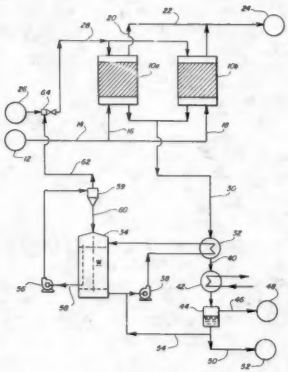
HEAT RECOVERY METHOD AND APPARATUS

Jesper Gronvaldt, Crete, Ill., assignor to Dedert Corporation, Olympia Fields, Ill.

Filed Jan. 10, 1985, Ser. No. 690,429

Int. Cl.[4] B01D *53/04*

U.S. Cl. 55—59 **8 Claims**



1. In a process which includes introducing water vapor possessing latent heat into a solvent-adsorption bed for recovering the solvent and thereby producing a solvent-laden desorbate vapor also possessing latent heat,

the improvement which comprises:

providing a body of liquid water at a temperature lower than the temperature of the solvent-laden desorbate vapor;

passing the solvent-laden desorbate vapor in a heat-transfer relationship with the body of liquid water so as to transfer heat onto the body of liquid water;

flashing the heated body of liquid water to vaporize at least a portion thereof; and

passing the vaporized heated-water portion into the solvent-adsorption bed,

whereby a portion of the desorbate latent heat is recovered from the vaporized heated-water portion and re-used in the process.

4,589,891

HYDROGEN PERMEATIN MEMBRANE, PROCESS FOR ITS MANUFACTURE AND USE

Nicolas Iniotakis, Jülich; Claus-Benedict von der Decken, Aachen, and Werner Fröhling, Düren, all of Fed. Rep. of Germany, assignors to Kernforschungsanlage Jülich Gesellschaft mit beschränkter Haftung, Jülich, Fed. Rep. of Germany

Filed Sep. 10, 1984, Ser. No. 648,898

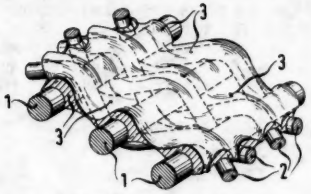
Claims priority, application Fed. Rep. of Germany, Sep. 8, 1983, 3332346

Int. Cl.[4] B01D *53/22*

U.S. Cl. 55—158 **16 Claims**

10. A hydrogen permeable membrane comprising a metal fabric with a hydrogen-permeable metal coating galvanically

deposited on and adhering to said metal fabric, wherein said metal fabric has a mesh width of about 40 microns at the most,



and wherein said metal coating has a thickness range of about 1 to 20 microns.

4,589,892

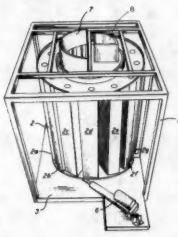
SEQUENCED MODULAR BED CAROUSEL DEHUMIDIFIER

David M. Leonard, Sunbury, Ohio, assignor to Bry-Air, Inc., Sunbury, Ohio

Continuation of Ser. No. 482,945, Apr. 7, 1983, abandoned. This application Dec. 6, 1984, Ser. No. 682,013

Int. Cl.[4] B01D *53/06*

U.S. Cl. 55—162 **12 Claims**



1. In a dehumidifying apparatus in which a desiccant medium is cyclically shifted between an operating active process condition and a regenerating condition, the improvement including:

(1) A carousel ring having a plurality of essentially identical modular desiccant beds being disposed substantially parallel to, and perpendicular to the ring axis, each of said beds being physically separate from the others and containing a desiccant medium and having a pair of air permeable sides which permit the flow of air in a radial direction with respect to the ring from one side of the bed to another side through the desiccant, said modular beds being disposed essentially radially in the ring between the outer circumference of the ring and an inner circumference of the ring;

(2) Divider means for operatively separating the modular beds of the ring from each other; said divider means disposed with respect to the inner and outer circumference of the ring in a relationship with respect to the beds so that one permeable side of each bed is operatively disposed towards the outer circumference of the carousel and the other permeable side of the bed is operatively disposed towards the inner circumference;

(4) Fixed isolation means cooperatively engageable with the dessicant beds on the ring for operatively segregating a predetermined number of modular beds on the ring from the other beds on the ring, to provide a first isolated class of air process beds upon the ring in which the bed desiccant is active and a second isolated class of beds upon the ring in which the bed desiccant is in a regenerating condition, said isolation means;

(A) being operatively disposed with respect to positions of the carousel at the inner circumference thereof and the outer circumference thereof to define separate operating sections in the apparatus for the radial flow of air through the beds in each respective class; and

(B) being further operatively disposed with respect to gradually engageable longitudinally extending sealing means which are axially disposed between the beds on the carousel ring and said isolation means in a correspondence with the separate operating sections; and

(5) Activator means for intermittently rotating the carousel ring with respect to the fixed isolation means about a predetermined angular segment around the axis of the carousel at a predetermined time interval, to shift a bed in the first class of active air process beds to the regenerating condition, and to shift a bed in the class of beds in the regenerating condition to the active condition.

4,589,893

STEAM SEPARATOR SUPERHEATER AND METHOD OF ASSEMBLY

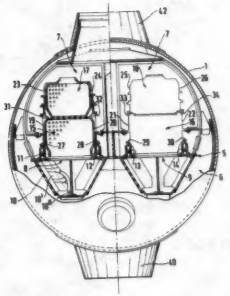
Marc Franzolini, Chevry II, and Jacques Marjollet, Paris, both of France, assignors to Stein Industrie, Velizy-Villacoublay, France

Filed Oct. 17, 1984, Ser. No. 661,846

Claims priority, application France, Oct. 19, 1983, 83 16629

Int. Cl.[4] B01D *53/26*

U.S. Cl. 55—269 **3 Claims**



1. A steam separator superheater comprising:

a horizontal axis cylindrical shell,

a frame within said shell separating said shell interior into an upper portion and a lower portion,

a steam and moisture separator mounted on said frame in said lower portion,

means defining at least one running path within said upper portion,

a steam superheater resting on said means defining at least one running path supported parallel to the horizontal axis of the shell by said frame,

the superheater comprising two stages, a lower stage and an upper stage, each stage comprising at least one bundle of hair-pin bent tubes extending over the major portion of the length of the cylindrical shell, and a steam header which is fixed to a tube sheet at one of the ends of each bundle,

various heating steam admission and condensate evacuation ducts connected to said steam headers,

a bundle of tubes of the upper stage of the steam superheater together with its steam header occupying a cross section not greater than that of the bundle of tubes of the lower stage of the steam superheater, together with its own steam header placed below the upper stage of the steam superheater,

the cylindrical shell being closed by end plate including at least one loading orifice aligned with said running path

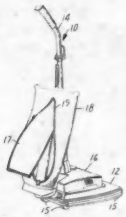
and a sleeve extending outside of the shell surrounding said orifice to enable insertion into the shell along the corresponding running path, said bundles of tubes in sequence, and passages through the upper wall of the shell provided with external tubes that are closable by caps which enable lifting lines to passed through the shell to permit lifting gear outside the shell to lift the bundle of tubes of the upper stage of the steam superheater with its steam header after it has been inserted into the shell via a loading opening and on a running path out of the way of said bundle of tubes and its steam header of the lower stage of said steam superheater subsequently inserted into the shell on the same running path.

4,589,894

DISPOSABLE FILTER FOR A VACUUM CLEANER

Vincent M. Gin, Hudson, and Gene E. Tharp, New Richmond, both of Wis., assignors to Minnesota Mining and Manufacturing Co., Saint Paul, Minn.

Filed Apr. 11, 1984, Ser. No. 599,265
Int. Cl.[4] B01D *29/12*
U.S. Cl. 55—274 **8 Claims**



1. A disposable filter especially suited for use as a dust and debris collection device for a vacuum cleaning apparatus, said filter comprising an assemby of juxtaposed layers, as follows:

(a) a first outer support layer of highly porous fabric formed of synthetic fibers, said fabric having an air permeability of at least 100 $m^3/min/m^2$ and a grab strength of at least about 1.0 kg;

(b) an inner filter layer formed of a web comprising randomly interentangled synthetic polymeric micro-fibers having an average diameter of about 2 to 6 microns and having a weight of about 70 to 140 g/m^2 and an air permeability of about 8 to 20 $m^3/min/m^2$; and

(c) a second outer supper layer of highly porous fabric formed of synthetic fibers, said second outer support layer being disposed on the opposite side of said web from said first outer support layer, said fabric of said second layer having an air permeability of at least 50 $m^3/min/m^2$ and a grab strength of at least about 1.0 kg wherein said layers are disposed with said first outer support layer positioned to initially receive an air stream passing through said layers.

4,589,895

GAS LINE DUST TRAP

Erwin P. Goldner, 2727 Felton St., San Diego, Calif. 92104

Filed Jun. 8, 1984, Ser. No. 618,550
Int. Cl.[4] B01D *46/02*
U.S. Cl. 55—357 **2 Claims**

1. A dust trap in combination with a gas pipe, comprising:

a dust bag having an open end and a closed end;

a member of deformable material for retaining the dust bag in the pipe, the member having a central bore, an outer portion dimensioned for force-fitting the member in the pipe, said outer portion having a plurality of parallel rings along its length, and a neck portion over which the open end of the bag is placed; and

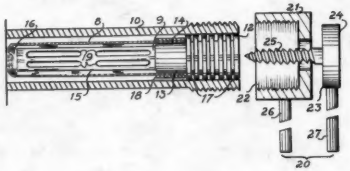
means for holding the open end of the bag on the neck portion.

2. A dust trap in combination with a gas pipe, comprising:

a dust bag having an open end and a closed end;

a member of deformable material for retaining the dust bag in the pipe, the member having a central bore, an outer portion dimensioned for force-fitting the member in the pipe, and a neck portion over which the open end of the bag is placed;

means for holding the open end of the bag on the neck portion; and



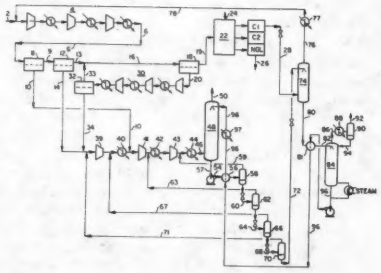
means for removing said member and dust bag from said pipe, said removing means comprising a capping device disposed on an open end of the pipe and having a central hole and a cork-screw projecting through said hold into the bore of the member and having a head portion bearing against an outer face of the capping device, said cork-screw being dimensioned to grip the member about the bore such that the cork-screw and member are forced out of the pipe by removing the capping device.

4,589,896

PROCESS FOR SEPARATING CO_2 AND H_2S FROM HYDROCARBONS

Michael S. K. Chen, Zionsville; Stephen P. Goff, Kutztown, and James VanOmmeren, Werley's Corner, all of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jan. 28, 1985, Ser. No. 695,582
Int. Cl.[4] F25J *3/02*
U.S. Cl. 62—28 **12 Claims**



1. A process for separating components of a feed gas containing CO_2, H_2S and C_1 and higher hydrocarbons to form a CO_2-rich stream, an H_2S-rich stream and a hydrocarbon-rich stream, said process comprising:

(a) passing said feed gas to a plurality of membrane separation units to form a plurality of acid gas-rich streams and a hydrocarbon-rich stream;

(b) compressing at least one acid gas-rich stream and passing said stream back through at least one membrane separation unit to further remove hydrocarbons and thereby form an additional hydrocarbon-rich stream;

(c) combining said hydrocarbon-rich streams to form a com-

bined hydrocarbon-rich stream containing less than 10 mole% CO_2;

(d) separating said combined hydrocarbon-rich stream to form a methane-rich stream and a higher hydrocarbon-rich stream;

(e) combining the acid gas-rich streams to form a combined acid gas-rich stream;

(f) compressing said combined acid gas-rich stream;

(g) contacting said combined acid gas-rich stream with a solvent capable of absorbing H_2S thereby forming a CO_2 product stream containing less than 100 ppm H_2S and an H_2S-rich solvent stream;

(h) passing said H_2S-rich solvent stream through a series of flash units to remove CO_2 from the H_2S-rich solvent stream;

(i) subsequently contacting the H_2S-rich solvent stream with the methane-rich stream in step (d) to further remove CO_2; and

(j) thermally treating the resultant H_2S-rich solvent stream to form an H_2S-rich product stream having a concentration of at least 30 mole% H_2S and a regenerated solvent stream.

4,589,897

METHOD FOR THE MANUFACTURING OF A FIBER WITH A TAPERED END HAVING A REFRACTIVE LENS

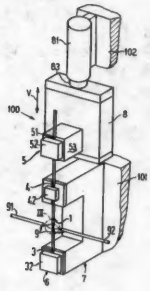
Konrad Mathyssek, Zorneding, and Rudolf Keil, Munich, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Feb. 22, 1985, Ser. No. 704,176

Claims priority, application Fed. Rep. of Germany, Mar. 2, 1984, 340820

Int. Cl.⁴ C03B *21/06*

U.S. Cl. 65—2 **4 Claims**



1. In a method for manufacturing a glass optical fiber with a tapered end having a refractive lens comprising the step of forming a constriction in a fiber, then separating the fiber at the constriction to form fibers with severed ends and melting the severed ends to form the refractive lenses, the improvement comprising the steps of separating the fiber at the constriction and melting the severed ends to form the lenses occurring in a single operation by means of locally heating the constriction of the fiber held substantially free of tension to heat the constriction to a high temperature at which the softened material of the fiber has such a low viscosity that the surface tension of the softened material has a deforming effect, said heating utilizing an alternating electronic arc, continuing the heating until the surface tension of the heated material causes a transverse severing in the area of the constriction and the forming of a desired curvature for the lens to occur, and then subsequent to forming the desired curvature for the lens, terminating the heating.

4,589,898

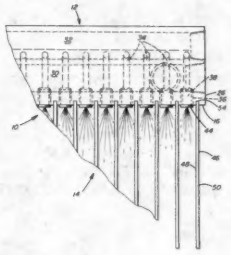
METHOD OF CLEANING HEAT TRANSFER FINS

Richard P. Beaver, Library, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 17, 1984, Ser. No. 682,400

Int. Cl.⁴ C03B *37/02*

U.S. Cl. 65—12 **18 Claims**



1. A method of removing scale buildup on heat transfer fins used to cool glass cones in a fiber glass bushing assembly comprising feeding a spray of alcohol-water solution containing 0.1 to 25 percent by volume alcohol therein across the surface of the fins and below the bushing tips periodically during running of the bushing to thereby remove deposits on said fins.

4,589,899

SEALING GLASS

Carl J. Hudecek, Toledo, Ohio, assignor to Owens-Illinois, Inc., Toledo, Ohio

Filed Nov. 5, 1984, Ser. No. 668,246

Int. Cl.⁴ C03C *3/066*

U.S. Cl. 65—33 **10 Claims**

5. A method of sealing a crystallizable glass sealing composition in a television picture tube component, the method comprising the steps of:

A. providing a crystallizable glass having the following ingredients in approximate percent by weight:

Ingredient	Percent By Wt.
PbO	73 to 76
ZnO	12 to 13.3
B_2O_3	8 to 9
SiO_2	1.8 to 2.3
BaO	1.8 to 2.1;

B. mixing finely divided particles of the glass with an effective amount of zinc zirconium silicate as a nucleating agent, the zinc zirconium silicate having an average particle size of about 2 to 8 microns, and;

C. heating the glass composition at about 440° C. to 460° C. to provide a seal for a television picture tube, the sealing

glass having suitable flow, expansion and wetting properties to provide a strong problem free seal, the crystallizing glass having a peak of about 15 to 25 minutes as evidenced by a DTA curve when the composition is heated at 440° C.

4,589,900

HIGH-STRENGTH THERMALLY STABLE MAGNESIUM ALUMINOSILICATE GLASS-CERAMIC MATRIX SIC FIBER COMPOSITE

John J. Brennan, Portland, Conn.; Kenneth Chyung, and Mark P. Taylor, both of Painted Post, N.Y., assignors to United Technologies Corporation, Hartford, Conn.

Continuation of Ser. No. 644,003, Aug. 24, 1984, abandoned, which is a division of Ser. No. 476,301, Mar. 17, 1983. This application Sep. 27, 1985, Ser. No. 781,309

Int. Cl.⁴ C03C *10/06*; C04B *35/56*

U.S. Cl. 65—33 **2 Claims**

5300 X

1. A method of forming silicon carbide fiber reinforced glass-ceramic matrix composites comprising hot pressing a mixture of about 15% to about 70% by volume of silicon carbide fibers in a glass powder matrix consisting essentially of:

MgO	5–15%	As_2O_3	0.5–3%
Al_2O_3	20–40%	Nb_2O_5	0–10%
SiO_2	40–60%	Ta_2O_5	0–10%
BaO	5–15%		

at about 1200° C. to about 1500° C., followed by heating the hot pressed composite at about 1100° C. to about 1200° C. for about 24 hours to about 60 hours resulting in a composite with high strength and thermal stability at temperatures in excess of 1200° C.

4,589,901

APPARATUS FOR AND METHOD OF BENDING GLASS SHEETS

Hideo Yoshizawa, Kanagawa; Masaaki Nushi, Tokyo; Kaoru Sakurai, Kanagawa; Hirotaro Usui; Naohiro Iida, both of Tokyo; Togo Tanaka, Kanagawa, and Seiichiro Honjo, Tokyo, all of Japan, assignors to Nippon Sheet Glass Co., Ltd., Osaka, Japan

Filed Jul. 19, 1985, Ser. No. 757,013

Claims priority, application Japan, Jul. 19, 1984, 59-151102; May 24, 1985, 60-111762

Int. Cl.⁴ C03B *23/02*

U.S. Cl. 65—107 **36 Claims**

1. An apparatus for bending a glass sheet, comprising:

a lower mold having an upper shaping surface;

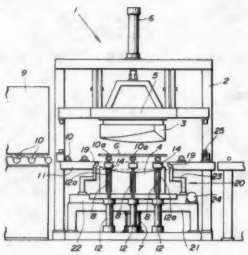
conveyor means for conveying the glass sheet as heated to a prescribed position over said shaping surface of said lower mold, said conveyor means including a plurality of rolls for supporting the glass sheet in said prescribed position;

means for vertically moving said rolls between an elevated position to support the glass sheet in said prescribed position and a lowered position below said shaping surface of said lower mold; and

means in said lower mold for accommodating said rolls when they are moved into said lowered position.

18. A method of bending a glass sheet, comprising the steps of:

conveying the glass sheet as heated horizontally to a position over the upper shaping surface of a lower mold;



stopping the glass sheet when it is deposited on a plurality of rolls which support the glass sheet in said prescribed position; and

moving said rolls from an elevated position in which they support the glass sheet in said prescribed position to a lowered position below said shaping suface of the lower mold, during which time said glass sheet is transferred onto said shaping surface, whereby said glass sheet is bent into conformity with said shaping surface under gravitational forces.

4,589,902

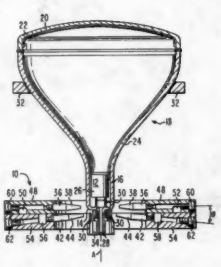
APPARATUS FOR SEALING A MOUNT IN A CATHODE-RAY TUBE

Michael A. Colacello, Trenton; Emil V. Fitzke, Lawrenceville, and Jack F. Otto, Trenton, all of N.J., assignors to RCA Corporation, Princeton, N.Y.

Filed Aug. 30, 1985, Ser. No. 771,355

Int. Cl.⁴ C03B *23/217*

U.S. Cl. 65—252 **10 Claims**



1. Apparatus for sealing a mount including a wafer in a neck of a cathode-ray tube oriented along an axis comprising:

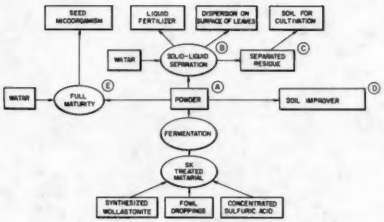
a first tier of burner tips disposed completely around said axis at a first distance therefrom and similarly aimed nonradially along directions tangent to a first circle; and

a second tier of burner tips disposed completely around said axis adjacent said first tier at a second distance from said axis and similarly aimed nonradially along directions tangent to a second circle, said first distance and the diameter of the first circle being greater, respectively, than said second distance and the diameter of the second circle.

4,589,903
METHOD FOR FERMENTATION OF A STOCKBREEDING WASTE

Zenjiro Sato, Tokyo, and Kazuyosi Kazama, Higashikurume, both of Japan, assignors to Zenyuu Ltd., Tokyo and Nilsei Kagaku Ltd., Higashikurume, both of, Japan

Filed Oct. 16, 1985, Ser. No. 788,159
Int. Cl.[4] C05F 11/08
U.S. Cl. 71—9 5 Claims

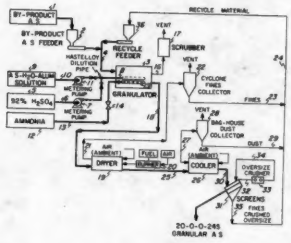


1. A method for fermentation of a stockbreeding waste which comprises mixing the stockbreeding waste, synthetic wollastonite and concentrated sulfuric acid to condense and granulate the mixture, adjusting the resulting granules to pH 6.0–7.85, water content of 65–78.5% and a temperature of 25°–35° C. and spontaneously fermenting the granules at a place not influenced by rainfalls.

4,589,904
GRANULATION OF CRYSTALLINE BY-PRODUCT AMMONIUM SULFATE

Cecil P. Harrison, Florence, and Cullen G. Tittle, Tuscumbia, both of Ala., assignors to Tennessee Valley Authority, Muscle Shoals, Ala.

Continuation-in-part of Ser. No. 654,278, Sep. 25, 1984, now Defensive Publication No. T105,501. This application Aug. 26, 1985, Ser. No. 769,058
Int. Cl.[4] C05D 9/00
U.S. Cl. 71—61 6 Claims



PILOT PLANT GRANULATION OF BY-PRODUCT AMMONIUM SULFATE

1. An improved process for utilizing by-product crystalline A/S for the production of high-purity granular A/S product of predetermined, closely controlled particle size eminently suitable for either subsequent direct application to soil systems or for utilization in fertilizer bulk blending operations, which improved process comprises the steps of:

(a) maintaining in an inclined rotating rotary ammoniator-granulator-type drum a rolling bed of discrete particles therein of crystalline by-product A/S and recycle material, said recycle material introduced therein from step (e) infra;

(b) continuously introducing into the upper end of said inclined rotating drum a stream of crystalline by-product A/S and recycle material;

(c) continuously introducing into said inclined rotating drum separate streams of sulfuric acid-A/S solution and gaseous anhydrous ammonia beneath the surface and near the center of the rolling granulation bed, with respect to its depth, the relative proportion of said sulfuric acid and said ammonia introduced into said rotating drum granulator being maintained so as to yield a mole ratio of NH_3:SO_4 in said granular A/S product ultimately removed therefrom in the range from about 1.80 to about 1.95;

(d) continuously introducing into the upper end of said inclined rotating drum fines and crushed oversize ammonium sulfate product recycled thereto from a later-mentioned sizing step;

(e) admixing said by-product crystalline A/S and said recycle material with sulfuric acid-A/S solution and ammonia in predetermined portions and for a time sufficient so as to effect agglomeration by both the chemical reaction and rolling action imparted by the rotating drum to said mixture of dry crystalline by-product A/S and recycle material;

(f) maintaining the materials introduced into said inclined rotating drum at a temperature and for a time sufficient to effect therein the agglomeration of granules of crystalline ammonium sulfate of size sufficient to range from between about 40 percent to about 90 percent minus 5- plus 9-mesh Tyler screen series;

(g) continuously discharging at least a portion of the granular material resulting from step (f) supra from the lower end of said inclined rotating drum and introducing same into drying means;

(h) maintaining the material introduced into said drying means at a temperature and for a time sufficient therein to reduce the moisture content thereof to the range of from about 0.1 percent to about 1.5 percent by weight and subsequently introducing same into cooling means;

(i) contacting the material in said cooling means with countercurrent flow of ambient temperature air for a time sufficient therein to reduce temperature of the A/S material therein to the range of from about 200° F. to about 260° F.;

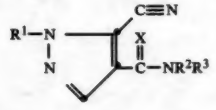
(j) subsequently removing the resulting cooled material from said cooling means in step (i) supra, and introducing into sizing means wherefrom product A/S granules ranging from about minus 5- to plus 9-mesh Tyler are recovered and withdrawn to storage and wherefrom undersize and crushed oversize are recycled to said feed-end of said inclined rotating granulation drum.

4,589,905
HERBICIDAL AND ALGICIDAL 1-ARYL-5-CYANO-1H-PYRAZOLE-4-CARBOXAMIDES

James R. Beck, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

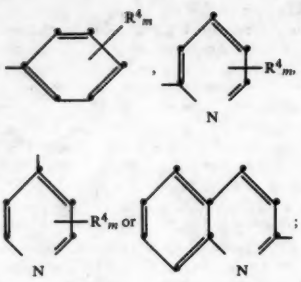
Continuation-in-part of Ser. No. 549,133, Nov. 7, 1983, abandoned. This application Sep. 13, 1984, Ser. No. 650,132
Int. Cl.[4] A01N 43/56, 43/40; C07D 231/14, 401/04
U.S. Cl. 71—66 45 Claims

1. A compound of the formula



wherein

R^1 is C_1–C_6 alkyl, C_3–C_6 cycloalkyl,



each of R^2 and R^3 is taken separately and is independently hydrogen, C_1–C_4 alkyl, C_3–C_4 alkenyl, C_3–C_4 alkynyl, C_3–C_4 cycloalkyl or C_1–C_3 alkoxy, or

R^2 and R^3 are taken together with the nitrogen atom to which they are attached and form piperidine, morpholine or pyrrolidine;

each R^4 independently is halogen, C_1–C_4 alkyl, C_1–C_4 alkoxy, C_1–C_4 haloalkyl, C_1–C_4 haloalkoxy or cyano;

X is O or S; and

m is 0–3;

with the provisos that when R^4 is C_1–C_4 alkyl, that substituent exists at other than the 2 or 6 position of the phenyl ring; and when R^2 is C_1–C_3 alkoxy R^3 is other than C_1–C_3 alkoxy.

33. A method for controlling undesired plants which comprises applying to the plants a growth inhibiting amount of a compound of claim 1.

4,589,906

INORGANIC DEPOT FERTILIZERS

Horst Brunn, Krefeld; Johannes Niggemann, Leverkusen; Peter Köhler, and Franz Hund, both of Krefeld, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Mar. 28, 1983, Ser. No. 479,772

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1982, 3212537

Int. Cl.[4] A01N *59/00*

U.S. Cl. 71—80 **8 Claims**

1. A depot ferilizer composition comprising an inorganic matrix and another inorganic and optionally organic component of the formula

$$XMe(II)O.[(1-X)/2]Me(III)_2O_3.YA.zI.aq$$

in which

Me (II) is at least one divalent metal,

Me (III) is at least one trivalent metal,

wherein iron is present as at least part of Me (II) and Me (III)

A is at least one inorganic acid or anhydride of an inorganic acid,

I is at least one organic compound,

aq is 0.5–9H_2O,

X is from above 0 to 1,

Y is from 0.0014 to 0.7, and

Z is from 0 to 20,

at least one of the components containing a plant nutrient element.

4,589,907

AMIDOMETHYL ESTER HERBICIDES

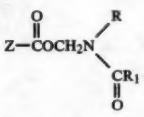
Raymond A. Felix, Richmond, Calif., assignor to Stauffer Chemical Company, Westport, Conn.

Filed Sep. 17, 1985, Ser. No. 776,931

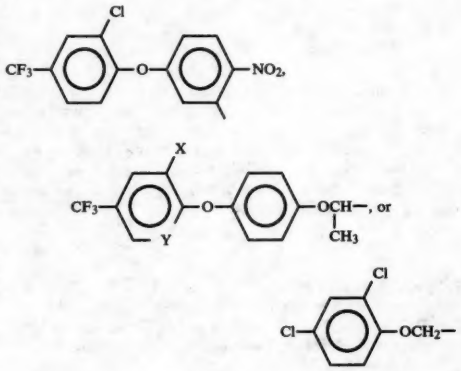
Int. Cl.[4] A01N *57/18, 39/04*

U.S. Cl. 71—86 **32 Claims**

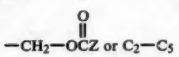
1. Compounds having the formula



in which Z is



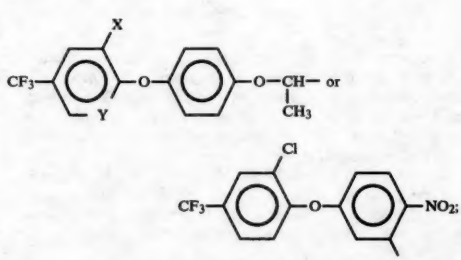
wherein X is hydrogen or halogen and Y is —CH or N; R is alkyl, phenyl, trihalomethylphenyl, cyanomethyl, carboalkoxymethyl,



alkenyl; and R_1 is hydrogen, lower alkyl, halo-(lower alkyl), or Z.

27. A compound having the formula

in which Z' is



G is nitrogen or phosphorus; R_3 is C_1–C_8 alkyl, X is hydrogen or halogen; and Y is —CH or N.

4,589,908

HERBICIDAL AGENTS

Hans Schumacher, Flörsheim am Main; Rudolf Heinrich, Kelkheim, and Hans-Günter Marks, Hattersheim am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

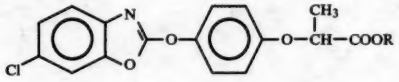
Continuation of Ser. No. 547,737, Nov. 1, 1983. This application May 15, 1985, Ser. No. 734,756

Claims priority, application Fed. Rep. of Germany, Nov. 4, 1982, 3240694

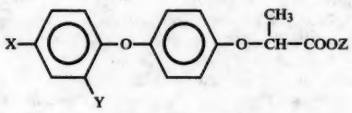
Int. Cl.[4] A01N *43/76, 37/40*

U.S. Cl. 71–88 **2 Claims**

1. A herbicidal agent, which consists essentially of an effective amount of a mixture of a first compound of the formula



wherein R is ethyl, and a second compound of the formula



wherein X and Y are chlorine and Z is methyl, the ratio of the amounts of the respective compounds being in a range of from 5:1 to 1:10.

4,589,909

BENZOFURAN AND BENZOTHIOPHENE SULFONAMIDES

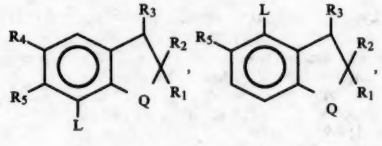
Morris P. Rorer, Newark, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 617,608, Jun. 5, 1984, abandoned. This application Mar. 6, 1985, Ser. No. 706,961

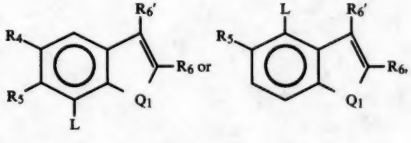
Int. Cl.[4] C07D *251/18, 251/16;* **A01N** *43/68, 43/66*

U.S. Cl. 71—90 **30 Claims**

1. A compound selected from:



I I'



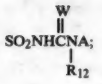
II II'

wherein

Q is O, S, SO or SO_2;

Q_1 is O, S or SO_2;

L is



R_1 is H or C_1–C_4 alkyl;

R_2 is H or C_1–C_4 alkyl;

R_3 is H or CH_3;

R_4 is H, Cl, CH_3, CF_3, OCH_3, Br, F, SCH_3 or OCF_2H;

R_5 is H, CH_3, OCH_3, Cl, Br, NO_2, CO_2R_7, SO_2R_8, OSO_2R_9, $SO_2NR_{10}R_{11}$, F, CF_3, SCH_3, OCF_2H or $SO_2N(OCH_3)CH_3$;

R_6 is H, Cl, Br or C_1–C_4 alkyl;

R_6' is H, CH_3, Cl or Br;

R_7 is C_1–C_3 alkyl, $CH_2CH{=}CH_2$, $CH_2CH_2OCH_3$ or CH_2CH_2Cl;

R_8 is C_1–C_3 alkyl;

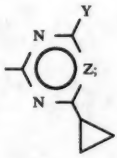
R_9 is C_1–C_3 alkyl or CF_3;

R_{10} and R_{11} are independently C_1–C_2 alkyl;

R_{12} is H or CH_3;

W is O or S;

A is



Y is C_1–C_2 alkyl, C_1–C_2 alkoxy, C_1–C_2 alkoxymethyl, SCF_2H, OCH_2CF_3, OCH_2CH_2F, CF_3, $OCH_2CH{=}CH_2$, $OCH_2C{\equiv}CH$, $NHCH_3$, $N(CH_3)_2$ or $CH(OCH_3)_2$; and

Z is N,

and their agriculturally suitable salts; provided that

(1) in Formulae II and II', when R_5 is NO_2, then R_6 is C_1–C_4 alkyl and R_6' is CH_3;

(2) when Q is SO, then W is O;

(3) when R_4 is other than H, then R_5 is H; and

(4) R_1 and R_2 taken together are not more than four carbon atoms.

4,589,910

NOVEL 4'(BENZISOTHIAZO-5-YLOXY)-PHENYLUREA DERIVATIVES, THEIR PREPARATION AND THEIR USE AS HERBICIDES

Helmut Hagen, Frankenthal; Hans Ziegler, Mutterstadt, and Bruno Wuerzer, Otterstadt, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

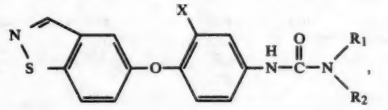
Continuation of Ser. No. 504,604, Jun. 15, 1983, abandoned. This application Apr. 30, 1985, Ser. No. 727,628

Claims priority, application Fed. Rep. of Germany, Jun. 19, 1982, 3222974

Int. Cl.[4] C07D *275/04;* **A01N** *47/38*

U.S. Cl. 71—90 **6 Claims**

1. A 4'-(benzisothiazol-5-yloxy)-phenylurea of the formula



I

where R^1 and R^2 are each a saturated straight-chain or branched aliphatic radical of 1 to 10 carbon atoms, an unsaturated straight-chain or branched aliphatic radical of 3 to 10

carbon atoms, or an araliphatic or aromatic radical which may be substituted by 1, 2 or 3 C_1–C_4-alkyl, C_1–C_4-alkoxy, cyano, halogen, nitro, monofluoromethyl or trifluoromethyl groups, or are each alkoxy of 1 to 6 carbon atoms, R^2 may furthermore be hydrogen, or R^1 and R^2, together with the nitrogen atom, may be members of a 5-membered or 6-membered ring which may contain further nitrogen and/or oxygen atoms as heteroatoms, and X is hydrogen, trifluoromethyl or chlorine.

4,589,911

FUSED N-PHENYLSULFONYL-N-TRIAZINYLUREAS

Josef Ehrenfreund, Allschwil, and Werner Föry, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

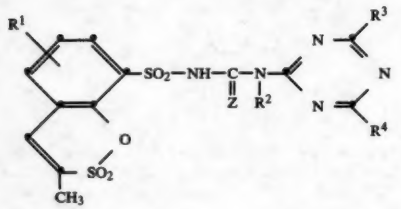
Filed May 1, 1984, Ser. No. 606,076

Claims priority, application Switzerland, May 11, 1983, 2592/83

Int. Cl.[4] C07D *411/12;* A01N *43/68, 43/70*

U.S. Cl. 71—91 14 Claims

1. A fused N-phenylsulfonyl-N'-triazylurea of the formula I



(I)

wherein

Z is oxygen or sulfur,

R^1 is hydrogen, halogen, nitro, C_1–C_4alkyl, C_1–C_4haloalkyl, cyano, or a —X—R^5, —CO—X—R^6, —CO—NR^7R^8, —SO—R^9 or —SO_2—R^{10} group,

R^2 is hydrogen, C_1–C_4alkyl or C_1–C_4alkoxy,

R^3 is C_1–C_4alkyl, C_1–C_4haloalkyl, C_1–C_4alkoxy, C_1–C_4-haloalkoxy or C_3–C_6cycloalkyl,

R^4 is hydrogen, halogen, C_1–C_4haloalkyl, C_1–C_4alkoxy, C_1–C_4haloalkoxy, C_2–C_4alkoxyalkoxy, C_3–C_6cycloalkyl or —$NR^{11}R^{12}$,

R^5 is C_3–C_5alkynyl or C_1–C_4alkyl which is unsubstituted or substituted by halogen or C_1–C_4-alkoxy, or is C_3–C_5alkenyl, which is unsubstituted or is substituted by halogen or C_1–C_4-alkoxy,

R^6 and R^9 are each independently C_1–C_4alkyl, C_1–C_4haloalkyl, C_2–C_4alkoxyalkyl, C_3–C_5alkenyl, C_3–C_5alkynyl, phenyl or benzyl,

R^7 and R^8 are each independently hydrogen, C_1–C_4alkyl, C_1–C_4haloalkyl, C_2–C_4alkoxyalkyl, C_3–C_5alkenyl, C_3–C_5alkynyl, phenyl or benzyl,

R^{10} is C_1–C_4alkyl, C_1–C_4alkoxy, C_1–C_4haloalkoxy or —$NR^{13}R^{14}$,

R^{11} and R^{12} are each independently hydrogen or C_1–C_4alkyl,

R^{13} and R^{14} are each independently hydrogen, C_1–C_4alkyl, C_1–C_4haloalkyl, C_2–C_4alkoxyalkyl, C_3–C_5alkenyl, C_3–C_5alkynyl, phenyl or benzyl, and

X is oxygen or sulfur,

or a salt thereof.

12. A method of inhibiting plant growth, which comprises applying an effective amount of a compound of the formula I according to claim 1 to the plant or the locus thereof.

4,589,912

N-AZIDOPHENYLSULFONYL-N'-TRIAZINYLUREAS

Rudolph C. Thummel, Courgenay, and Werner Föry, Basel, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

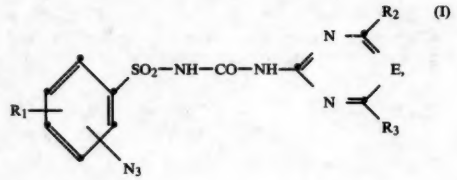
Division of Ser. No. 525,365, Aug. 22, 1983, Pat. No. 4,555,262. This application Aug. 7, 1985, Ser. No. 763,175

Claims priority, application Switzerland, Sep. 1, 1982, 5196/82

Int. Cl.[4] C07D *251/18, 251/46, 251/52;* A01N *43/70*

U.S. Cl. 71—93 18 Claims

1. An N-azidophenylsulfonyl-N'-triazinylurea of the formula I



(I)

wherein

E is nitrogen,

R_1 is hydrogen, halogen, nitro, C_1–C_4alkyl, C_1–C_4haloalkyl, C_1–C_4alkoxy, C_1–C_4haloalkoxy, C_1–C_4alkoxycarbonyl, C_1–C_4alkylthio, C_1–C_4alkylsulfinyl, C_1–C_4alkylsulfonyl or C_2–C_5alkoxyalkoxy,

R_2 is C_1–C_3alkyl, C_1–C_3alkoxy or C_1–C_3haloalkoxy,

R_3 is hydrogen, halogen, C_1–C_3alkyl, C_1–C_3haloalkyl, C_1–C_3alkoxy, C_1–C_3haloalkoxy, C_2–C_5alkoxyalkoxy or —NR_4R_5, wherein

R_4 is hydrogen or methyl and

R_5 is hydrogen, methyl, ethyl or methoxy,

or a salt thereof.

4,589,913

ALKOXYCARBONYLTHIOAMINO-SUBSTITUTED TRIAZINONES

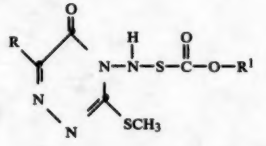
Kurt H. Pilgram, and Gene A. Bozarth, both of Modesto, Calif., assignors to Shell Oil Company, Houston, Tex.

Filed Mar. 25, 1985, Ser. No. 715,790

Int. Cl.[4] A01N *43/707;* C07D *253/06*

U.S. Cl. 71—93 2 Claims

1. A compound of the formula:



(I)

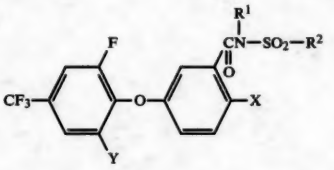
wherein R is straight-chain or branched-chain alkyl of three to five carbon atoms or cycloalkyl of three or four carbon atoms, and R^1 is straight-chain or branched-chain alkyl of one to eight carbon atoms.

4,589,914
HERBICIDAL COMPOUNDS

David Cartwright, Reading, England, assignor to Imperial Chemical Industries PLC, London, England

Filed Mar. 27, 1984, Ser. No. 594,012
Claims priority, application United Kingdom, Apr. 8, 1983, 8309648
Int. Cl.[4] A01N *41/06;* C07C *143/74*
U.S. Cl. 71—103 6 Claims

1. A diphenyl ether compound of the formula (I):



(I)

wherein

X is hydrogen, halogen, alkyl of 1 to 4 carbons, nitro or CF_3;

Y is fluorine or chlorine;

R^1 is hydrogen, chlorine, bromine or iodine, alkyl of 1 to 4 carbons, or an agriculturally acceptable cation; and

R^2 is a group —OM where M is hydrogen or agriculturally acceptable cation, a group —ZR^3 where Z is oxygen or sulphur and R^3 is alkyl of 1–12 carbons, or a group —NR^5R^6 where R^5 and R^6 are each selected from the group consisting of hydrogen, alkyl of 1–12 carbons, alkoxy of 1–4 carbons, phenyl, a phenyl substituted with halogen, hydroxy, C_1 to C_4 alkyl, C_1 to C_4 alkoxy, C_1 to C_4 alkylthio, carboxy, C_2 to C_5 alkoxycarbonyl, cyano or phenyl.

5. A process of inhibiting the growth of unwanted plants, which comprises applying to the plants, or to the locus thereof, a phytotoxic amount of a compound as claimed in claim 1.

4,589,915
ADDITIVE FOR METALLURGIC LIQUIDS BEING EFFECTIVE TO IMPROVE THE CHARACTERISTICS OF METAL OR METAL ALLOY ARTICLES OF MANUFACTURE

Mario D. Gorgerino, Milan, Italy, assignor to O.E.T. Metalconsult s.r.l., Milan, Italy

Filed Feb. 19, 1985, Ser. No. 703,164
Claims priority, application Italy, Feb. 28, 1984, 19828 A/84
Int. Cl.[4] C21C *7/02*
U.S. Cl. 75—53 15 Claims

1. An additive for metallurgic liquids effective to improve the characteristics of the metal or metal alloy articles produced, characterized in that it comprises at least one colloidal substance comprising from 20% to 99.9% by weight colloidal silica, in the siloxane three-dimensional lattice form, comprising from 1% to 99.9% dispersed particles by the weight of said colloidal silica.

4,589,916
ULTRA CLEAN STAINLESS STEEL FOR EXTREMELY FINE WIRE

Shinichi Sasayama, Gunma, Japan, assignor to Daido Tokushuko Kabushiki Kaisha, Nagoya, Japan

Filed Feb. 22, 1985, Ser. No. 704,242
Claims priority, application Japan, Feb. 23, 1984, 59-33242
Int. Cl.[4] C22C *38/16*
U.S. Cl. 75—126 R 1 Claim

1. An ultra clean stainless steel for use in the manufacture of extremely fine stainless steel wire, comprising an Al content of 0.006% or less, by weight, an O content of 10 ppm or less, by weight, and being free of inclusions having a particle size of 10 micron or greater.

4,589,917
DECORATIVE GOLDEN SINTERED ALLOY

Yoshio Nagato, Kokubu, Japan, assignor to Kyocera Corporation, Japan

Filed Jul. 26, 1984, Ser. No. 634,621
Claims priority, application Japan, Jul. 28, 1983, 58-139117
Int. Cl.[4] C22C *29/04*
U.S. Cl. 75—238 4 Claims

1. A decorative gold-colored sintered alloy consisting essentially of:

51 to 98% by weight of titanium nitride;

1 to 19% by weight of chromium carbide; and

1 to 30% by weight of nickel,

wherein the titanium nitride forms a dispersed phase or particles and the nickel containing chromium in the form of an alloy forms a binder.

3. A gold-colored sintered alloy consisting of:

51 to 98% by weight of titanium nitride;

1 to 19% by weight of chromium carbide; and

1 to 30% by weight of nickel.

4,589,918
THERMAL SHOCK RESISTANT THERMOELECTRIC MATERIAL

Isao Nishida, Chiba, and Katashi Masumoto, Tokyo, both of Japan, assignors to National Research Institute for Metals, Tokyo, Japan

Filed Mar. 28, 1984, Ser. No. 594,895
Int. Cl.[4] C22C *29/14;* H01L *35/00*
U.S. Cl. 75—244 15 Claims

1. A thermoelectric material comprising an alloy, a solid solution or an alloy admixed with a solid solution consisting essentially of

(a) iron disilicide and

(b) 0.3 to 4.6 atomic %, based on the total amount of the whole component elements, of boron.

4. A thermoelectric material comprising an alloy, a solid solution or an alloy admixed with a solid solution consisting essentially of

(a) iron disilicide,

(b) 0.3 to 4.6 atomic %, based on the total amount of the whole component elements, of boron and

(c) 0.1 to 5.0 atomic %, based on the total amount of the whole component elements, of one element or more selected from the group consisting of zinc, cadmium and mercury of Group IIB, aluminum, gallium, indium and thallium of Group IIIB, phosphorus, arsenic, antimony and bismuth of Group VB, sulfur, selenium and tellurium of Group VIB, chromium, molybdenum and tungsten of Group VIA, manganese, technetium and rhenium of Group VIIA and cobalt, nickel, rhodium, palladium, iridium and platinum of Group VIII in the periodic table of elements.

4,589,919
METAL BOUND AND BALLASTED HYDRIDABLE PELLETS

Paul D. Goodell, Ridgewood, N.J.; Ernest L. Huston, Tuxedo Park, N.Y.; Peter S. Rudman, and Gary D. Sandrock, both of Ringwood, N.J., assignors to Ergenics, Inc., Wyckoff, N.J. and Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jul. 2, 1981, Ser. No. 279,713
Int. Cl.[4] C01B *6/00*
U.S. Cl. 75—251 2 Claims

1. A porous, metallurgically bonded, heat-ballasted hydridable mixture in pellet form wherein the solid ingredients comprise about 40 vol. % or less of a hydridable metal or alloy and about 60 vol. % or more of a ballast metal powder from the group consisting of nickel, copper iron and aluminum.

4,589,920

INK COMPOSITION UTILIZED IN LITHOGRAPHIC PRINTING AND A LITHOGRAPHIC PRINTING PROCESS

Eiji Kanada; Toshiro Kondo, both of Nagaokakyo, and Kenichi Isobe, Annaka, all of Japan, assignors to Mitsubishi Paper Mills, Ltd. and Shin-Etsu Chemical Ltd., both of Tokyo, Japan

Filed Oct. 7, 1983, Ser. No. 540,170

Claims priority, application Japan, Oct. 8, 1982, 57-177141; Oct. 8, 1982, 57-177142; Jul. 7, 1983, 58-123670

Int. Cl.[4] C09D *11/08*

U.S. Cl. 106—30 **22 Claims**

1. A lithographic printing process using a printing ink and a dampening solution characterized by using a printing ink containing as an ink additive an organopolysiloxane having at least one hydrophilic group.

4,589,921

PROCESS FOR IMPROVING THE APPLICATION PROPERTIES OF PIGMENT YELLOW 13

Klaus Hunger, Kelkheim, and Wolfgang Rieper, Frankfurt am Main, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Continuation of Ser. No. 614,718, May 29, 1984, abandoned, which is a continuation of Ser. No. 398,117, Jul. 14, 1982, abandoned. This application Jun. 10, 1985, Ser. No. 743,270

Claims priority, application Fed. Rep. of Germany, Jul. 16, 1981, 3128057

Int. Cl.[4] C09B *62/01, 67/00;* **C09D** *11/02*

U.S. Cl. 106—288 Q **8 Claims**

1. A process for the production of a pigment product having high hiding power and flowability which comprises heating the crude Pigment Yellow 13 resulting from coupling, in an aqueous suspension in the absence of an organic solvent to a temperature of from 120° to 150° C. under pressure.

4,589,922

FLUIDIZED PIGMENT PRESSCAKE

Thomas E. Donegan, Holland, Mich., assignor to BASF Wyandotte Corporation, Wyandotte, Mich.

Filed Nov. 25, 1983, Ser. No. 555,277

Int. Cl.[4] C09B *56/14;* **C09D** *3/40*

U.S. Cl. 106—308 Q **11 Claims**

1. A fluidized high solids phthalocyanine pigment presscake comprising by weight about 35 to 55 percent pigment, about 3.0 to 10.0 percent saponified rosin and about 40 to 60 percent water.

7. A process of fluidizing a high solids phthalocyanine pigment presscake which contains by weight about 40 to 55 percent pigment and about 45 to 60 percent water comprising the steps of mixing said high solids pigment presscake with alkali metal or ammonium hydroxide and rosin the amount of said rosin being about 3.0 to 10.0 parts by weight per 100 parts by weight of said pigment and the amount of said hydroxide being about 0.25 to 1.25 parts by weight per 100 parts by weight of said pigment.

4,589,923

APPARATUS FOR REMOVING LIQUID FROM FIBROUS MATERIALS

Werner Gruenewald, Wolfenbuettel, Fed. Rep. of Germany, assignor to Braunschweigische Maschinenbauanstalt, Brunswick, Fed. Rep. of Germany

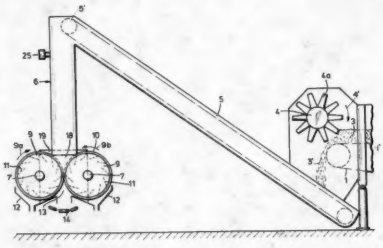
Filed Nov. 2, 1984, Ser. No. 667,715

Claims priority, application European Pat. Off., Nov. 8, 1983, 83111122.4; Oct. 3, 1984, 84111788.0

Int. Cl.[4] C13D *1/02*

U.S. Cl. 127—4 **19 Claims**

1. An apparatus for removing liquid from fibrous materials, comprising means for supplying said fibrous materials to said apparatus, a pair of hollow compression rollers, each roller having perforated circumferential wall means with open holes in said roller wall means, frame means including bearing means for operatively supporting said compression rollers, each of said compression rollers having a rotational roller axis extending horizontally in the same horizontal plane as the respective other horizontal axis, said compression rollers operating in a range of relatively low compression frame about 0.5 kg/cm^2 to about 50 kg/cm^2, said compression rollers forming a feed-in gap facing substantially upwardly for receiving fibrous material, funnel wall means forming in a sealing manner an inlet funnel into said feed-in gap, material supply chute means extending substantially vertically and leading to said inlet funnel for feeding material into said feed-in gap, said chute means



having a predetermined upward length for establishing a sufficiently high column of fibrous material above said feed-in gap to assure a substantially constant static pressure at said feed-in gap, and material entraining members operatively secured to said circumferential walls of said compression roller means, said material entraining members extending substantially radially out of said compression roller means, said material entraining members being arranged in a staggered relationship relative to one another on said circumferential wall means of said compression rollers such that entraining members on one compression roller are alternately effective on material in said feed-in gap relative to entraining members on the other compression roller and vice versa.

4,589,924

PROCESS FOR HYDROLYZING CELLULOSE-CONTAINING MATERIAL WITH GASEOUS HYDROGEN FLUORIDE

Rüdiger Erckel, Eppstein; Raimund Franz, Kelkheim; Rolf Woernle, Bad Soden am Taunus, and Theodor Riehm, Heidelberg, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 434,581, Oct. 15, 1982, abandoned. This application Mar. 12, 1985, Ser. No. 710,520

Claims priority, application Fed. Rep. of Germany, Oct. 24, 1981, 3142216

Int. Cl.[4] C13K *1/02*

U.S. Cl. 127—37 **6 Claims**

1. A semi-continuous process for hydrolyzing cellulose-containing material with gaseous hydrogen fluoride by sorption of HF and subsequent desorption, which comprises, for n batches of said material,

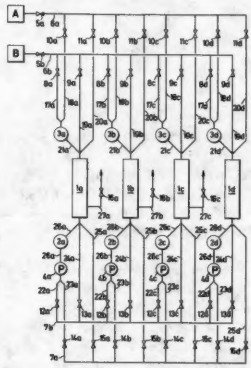
carrying out said sorption and desorption in n steps in n reactors, each step independent from each other with respect to each said batch of said material, said n steps being carried out on each said batch of material as follows:

initially, sorption in the first to (n/2)th step, by the action of HF-inert gas mixtures following through said material, said sorption step being carried out at temperatures above the boiling point of hydrogen fluoride so that the thus-sorbed fluid is always a gas mixture, the HF concentration of the HF-inert gas mixtures having HF concentrations which increase from sorption step to sorption step,

then desorption in the ((n/2)+1) to nth step, by treatment

with heated HF-inert gas mixtures passing through said material, said mixtures having HF concentrations which decrease from desorption step to desorption step;

wherein n is an even number from 4 to 12 and wherein the n steps take place simultaneously in different reactors but in the same reactor for each batch of material in identical time periods and wherein the sequence of steps from batch to batch is each displaced by one said time period and



wherein, during each period, the batch undergoing the first step is in HF-inert gas-circulating communication with the batch undergoing the nth step and the batch undergoing the second step is in HF-inert gas-circulating communication with the batch undergoing the penultimate (n−1)th step, and any remaining batches through the (n/2)th step are in HF-inert gas circulating communication with the respective batches through the ((n/2)+1)th step.

4,589,925

METHODS FOR CLEANING MATERIALS

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Los Angeles, Calif.

Continuation-in-part of Ser. No. 453,496, Dec. 27, 1982, which is a continuation-in-part of Ser. No. 318,629, Nov. 5, 1981, Pat. No. 4,445,925. This application Dec. 7, 1984, Ser. No. 679,235

The portion of the term of this patent subsequent to Apr. 23, 2002, has been disclaimed.

Int. Cl.[4] C23G *1/02*; B08B *9/00*

U.S. Cl. 134—3 **47 Claims**

1. A method for removing matter from a substrate, which method comprises the step of contacting said matter with a composition comprising urea and sulfuric acid in which the urea/sulfuric acid molar ratio is within the range of about ½ to less than 2, and said urea and sulfuric acid, in combination, comprise at least about 30 weight percent of said composition.

4,589,926

METHOD AND COMPACT MACHINE FOR TREATING PRINTED CIRCUIT CARDS

Rune H. Holmstrand, Vålberg, Sweden, assignor to AB Holmstrands Platindustri, Vålberg, Sweden

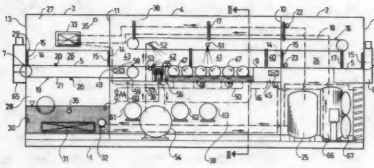
Filed May 23, 1984, Ser. No. 613,597

Claims priority, application Sweden, Jun. 17, 1983, 8303475

Int. Cl.[4] B01D *3/00*

U.S. Cl. 134—6 **12 Claims**

1. A method of dispensing printed circuit cards in a compact machine for removing impurities from a surface of the printed cards subjected in a separate step to a soldering operation using a fluxing agent, said machine having an inlet and an outlet end section and an intermediate section having upper and lower, separated from one another, spaces, the upper of which defines a treating chamber having a plurality of successive treating zones comprising at least a washing and brushing zone, for removing impurities from the lower surface of the printed circuit cards by the action of brushes and cold solvent, and a subsequent drying zone in which the printed circuit cards are subjected to hot air flow for removing solvent therefrom, said method comprising feeding the cards through the machine sections along a horizontal transport track from the machine inlet end section to and through the machine outlet end section, providing a first closed loop within said intermediate and outlet sections for recycling solvent used in the treating chamber and containing impurities removed from the cards and collected in a trough means in the upper space of the intermediate section, said solvent with impurities therein being passed from an upstream end of the trough means to distiller means in the outlet end section of the machine for vaporizing and condensing the vaporized solvent, condensed cold solvent, substantially free of impurities, being returned to the downstream side of the trough means in the treating chamber; providing a second closed loop path in the intermediate section for said hot air flow for removing solvent from solvent wetted cards as they pass along said track through said intermediate section, said second path including a cooling means and blower means in the upper space of the intermediate section and an air compressor in the lower space thereof, solvent contained in the air being condensed in the cooling means and passed to said distiller means while the air freed of solvent is fed to said air compressor to heat the air between 0°–10° C. above the boiling point of the solvent, and supplying the thus heated air to said blower means for discharge unto the solvent wetted cards; and providing a third closed loop for distilling solvent and com-



prising said distiller means including a heat exchanger in a solvent tank in a lower space of the outlet end section for vaporizing solvent therein and a cooler in an upper space of the outlet end section for condensing the vaporized solvent.

4. A compact machine for cleansing printed circuit cards to remove impurities from one surface of said cards which have been subjected in a separate step to a soldering operation using fluxing agents, comprising an inlet and an outlet end section and an intermediate section therebetween and having upper and lower, separated from one another, spaces, the upper of which defines a treating chamber having a plurality of successive treating zones comprising at least a washing and brushing zone for removing impurities from the cards, and a drying zone wherein the cards are subjected to hot air flow, a horizontal transport track extending through said machine sections, a first means in the intermediate and outlet end sections of the machine for recycling solvent and comprising distiller means for vaporizing solvent and for condensing the solvent thus vaporized and including trough means in the treating chamber, said trough means having an upstream and a downstream end, solvent with impurities therein in the upstream end of the trough means supplied to the distiller means for vaporization and condensation, cold condensed vaporized solvent being supplied to the downstream end of the trough means; second means in the intermediate section of the machine for circulating hot air in a closed loop and comprising a cooling means, blower means and an air compressor, said second means being effective to separate solvent in the air from the air by said cooling means, the separated solvent being supplied to said distiller means, the air stripped of the solvent being heated by

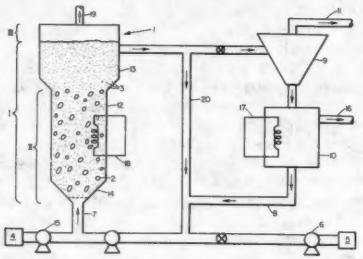
said air compressor and supplied to said blower means for blowing said heated air onto solvent wetted cards as they move along said track; and third means, including said distiller means comprising heating means in a solvent tank and a cooler, for supplying heat values to the heating means produced on cooling solvent to liquid form and including for this purpose a solvent compressor at the inlet section of the machine.

4,589,927

LIQUID MULTISOLID FLUIDIZED BED PROCESSING

Billy R. Allen, Westerville; William J. Huffman, Worthington, and Herman Nack, Columbus, all of Ohio, assignors to Battelle Development Corporation, Columbus, Ohio

Filed May 29, 1984, Ser. No. 615,026
Int. Cl.[4] B08J 8/20, 8/32
U.S. Cl. 134—25.1 16 Claims



1. A method for improving contact of liquid and solid phases in a reactor comprising;

introducing a liquid fluidization medium into a lower region of the reactor,

forming an entrained fluidized bed of a first relatively fine, solid particles with the liquid fluidization medium in a first space region within the reactor,

forming a dense fluidized bed of a second, relatively coarse solid particle component with the liquid fluidization medium in a more limited space region within the first space region, and

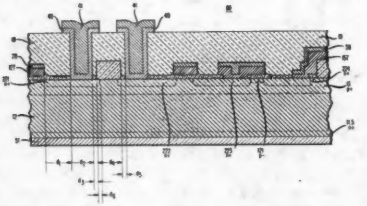
recirculating the first relatively fine particles from an upper region of the first space region through the dense fluidized bed in the more limited space region.

4,589,928

METHOD OF MAKING SEMICONDUCTOR INTEGRATED CIRCUITS HAVING BACKSIDE GETTERED WITH PHOSPHORUS

John V. Dalton, Allentown, Pa.; Kenneth J. Orlowsky, Middlesex, N.J., and Ashok K. Sinha, Allentown, Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Aug. 21, 1984, Ser. No. 642,932
Int. Cl.[4] H01L 7/50, 21/324
U.S. Cl. 148—1.5 12 Claims



1. In a method of fabricating a semiconductor integrated circuit integrated at a top major surface of a semiconductor body, the step of:

gettering the body with phosphorus by heating the body at an elevated temperature in an atmosphere containing phosphorus at a time when the top surface, but not the bottom surface, of the body is protected against the penetration of phosphorus by means of a sacrificial glass layer which has a sufficiently low phosphorus concentration that essentially no phosphorus diffuses from it into the body.

4,589,929

METHOD FOR TREATING THE SURFACE OF FINISHED PARTS, PARTICULARLY THE SURFACE OF TUBES AND SPACERS FORMED OF ZIRCONIUM ALLOYS, FOR NUCLEAR REACTOR FUEL ASSEMBLIES

Eckard Steinberg, Erlangen, Fed. Rep. of Germany, assignor to Kraftwerk Union Aktiengesellschaft, Mülheim, Fed. Rep. of Germany

Filed Feb. 9, 1984, Ser. No. 578,547
Int. Cl.[4] C23F 7/02
U.S. Cl. 148—6.3 2 Claims

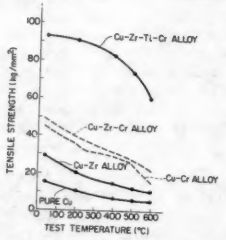
1. Method for treating the surface of finished parts formed of zirconium alloys for nuclear reactor fuel assemblies with an oxidizing agent, which comprises heating the finished parts in an autoclave and subjecting the finished parts to hydrogen peroxide (H_2O_2) as an oxidizing agent sufficient to generate oxygen in atomic form and to form a substantially hydrogen-impervious surface layer of oxide at least on the surface portions of the finished parts which are subjected to water or steam in the nuclear reactor, and heating the finished parts and the H_2O_2 in the autoclave to a temperature substantially in the range from 400° C. to 550° C.

4,589,930

CASTING METAL MOLD AND METHOD OF PRODUCING THE SAME

Yozo Kumagai, Katsuta, Japan, assignor to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 29, 1984, Ser. No. 584,821
Claims priority, application Japan, Mar. 2, 1983, 58-32786
Int. Cl.[4] C22C 9/00
U.S. Cl. 148—11.5 C 10 Claims



1. A batch-type casting metal mold made of a copper alloy consisting essentially of 0.01 to 3 wt % of zirconium, 0.03 to 5 wt % of titanium and the balance substantially copper, said alloy having a structure in which a precipitate phase consisting of a compound of copper and at least one of zirconium and titanium exists, said metal mold having, at the normal temperature a Brinell hardness between H_B 100 and H_B 500 and an electric conductivity between 20 and 80% in terms of IACS.

4,589,931

METHOD OF PRODUCING A THIN STEEL SHEET HAVING BAKING HARDENABILITY AND ADAPTED FOR DRAWING

Akira Yasuda; Toshio Irie, and Motoyuki Konishi, all of Chiba, Japan, assignors to Kawasaki Steel Corporation, Kobe, Japan

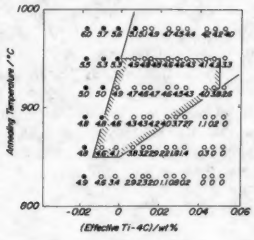
PCT No. PCT/JP81/00353, § 371 Date Jul. 23, 1982, § 102(e) Date Jul. 23, 1982, PCT Pub. No. WO82/01893, PCT Pub. Date Jun. 10, 1982

Continuation-in-part of Ser. No. 545,105, Oct. 24, 1983, abandoned, which is a continuation of Ser. No. 403,617, Jul. 23, 1982, abandoned. This PCT application Nov. 21, 1981, Ser. No. 709,982

Claims priority, application Japan, Nov. 26, 1980, 55-165315

Int. Cl.[4] C21D *9/48*

U.S. Cl. 148—12 C **1 Claim**



1. A method of producing a thin steel sheet adapted for drawing, comprising subjecting a cold rolled thin steel, which has a composition containing 0.001–0.010% by weight of C, not more than 1.0% by weight of Mn, not more than 1.2% by weight of Si, not more than 0.1% by weight of P, not more than 0.02% by weight of S and not more than 0.01% by weight of N, and further containing effective Ti in an amount larger than (4 times amount of [C] content minus 0.015% by weight) but smaller than (4 times amount of [C] content plus 0.05% by weight) said effective Ti being remaining Ti after (48/32[S]+48/14[N])% by weight of Ti is substracted from the total amount of Ti depending upon the [S] and [N] contents in the steel, to a continuous annealing under a condition that the sheet is heated at a temperature, which lies within the range of from 850° C. and further lies within the range of from 850° C.+(70/0.05){[effective Ti]% by weight−4% by weight ° C. to 950° C.+(100/0.015){[effective Ti] % by weight −4[C]% by weight}° C. depending upon the amount of [effective Ti] and [C] content, for a period of from 10 seconds to 5 minutes, and the above heated sheet is rapidly cooled at a cooling rate of at least 10° C. per second within the temperature range of 850°–500° C. during the cooling step following to the heating, so as to obtain the thin steel sheet having a striking energy-absorbing property of at least 6 kgm/cm^2 in a Charpy impact test at −100° C., a r value of at least 1.8 and a baking hardenability of at least 4 kg/mm^2.

4,589,932

ALUMINUM 6XXX ALLOY PRODUCTS OF HIGH STRENGTH AND TOUGHNESS HAVING STABLE RESPONSE TO HIGH TEMPERATURE ARTIFICIAL AGING TREATMENTS AND METHOD FOR PRODUCING

Bom K. Park, Monroeville, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

Filed Feb. 3, 1983, Ser. No. 462,712

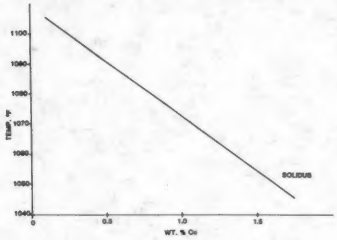
Int. Cl.[4] C22F *1/04*

U.S. Cl. 148—12.7 A **80 Claims**

9. A method of producing a structural aluminum alloy member comprising the steps of:

(a) providing a body of aluminum base alloy consisting essentially of 0.4 to 1.2% silicon, 0.5 to 1.3% magnesium, the amount of magnesium exceeding the amount of silicon by 0.1 to 0.4% from above, 0.6% to 1.1% copper, 0.1 to 1% manganese, not more than 0.6% iron, the balance being essentially aluminum and incidental elements and impurities;

(b) heating said body to a temperature in the range of 1020° to 1080° F., said temperature being within 50° F. of the solidus temperature for said alloy;



(c) working said body to produce a wrought aluminum product;

(d) solution heat treating said wrought aluminum product at a temperature within the range of 1020° to 1080° F.; and

(e) quenching said product.

4,589,933

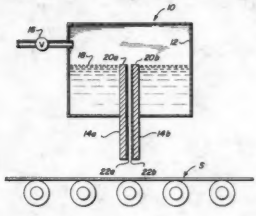
METHOD OF QUENCHING HOT STRIP MILL PRODUCT

Walter L. Stitz, Ellicott City, Md., assignor to Bethlehem Steel Corporation, Bethlehem, Pa.

Filed Jun. 13, 1985, Ser. No. 744,431

Int. Cl.[4] C21D *1/62*

U.S. Cl. 148—143 **4 Claims**



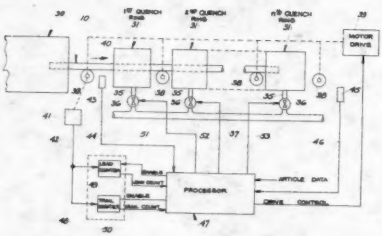
1. In a method of improving the metallurgical properties of a hot strip band subjected to quenching by the application thereto of recycled industrial water containing heavy concentration of suspended solids, oil and mill scale, including the steps of providing a hot strip run-out table having a plurality of quenching stations above said table, where each said station includes a reservoir for said water and a pair of vertically aligned, spaced-apart throat plates arranged to channel such water from the reservoir to said strip passing over said run-out table, the improvement comprising in combination therewith the step of providing a continuous curtain of such water flowing from said throat plates to said strip, where said continuous curtain is maintained by having the major inner surface of each said throat plate coated with a resinous compound characterized by the ability to repel oil and grease.

4,589,934

GRINDING ROD AND METHOD FOR PRODUCTION THEREOF

Robert J. Glodowski, Middletown, Ohio, and Vernon C. Van Slyke, Raytown, Mo., assignors to Armco Inc., Middletown, Ohio

Filed Aug. 24, 1981, Ser. No. 295,685
Int. Cl.[4] C21D *9/00*
U.S. Cl. 148—145 **17 Claims**



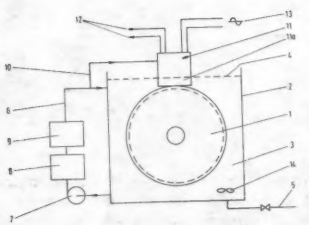
9. A method for selective quenching of an elongated high carbon or alloy steel article of uniform cross-sectional area, comprising the steps of heating said article to a desired temperature, continuously passing said article in a linear path of travel through at least one liquid quench zone, detecting the position of the leading end of said article prior to entering said liquid quench zone, initiating a liquid quench spray in said quench zone after the leading end of said article has emerged therefrom and after a predetermined linear length of travel of said article responsive to said step of detecting the position of said leading end, and turning off said liquid spray in said quench zone before entry of the trailing end of said article thereinto.

4,589,935

METHOD OF INDUCTION HARDENING OF GEAR TEETH

John R. A. Scott, Hawcoat, United Kingdom, assignor to Vickers Shipbuilding & Engineering Limited, Cumbria, England

Filed Jul. 18, 1984, Ser. No. 631,923
Claims priority, application United Kingdom, Jul. 22, 1983, 8319788
Int. Cl.[4] C21D *1/10*
U.S. Cl. 148—147 **7 Claims**



1. A process for induction hardening of the flank and root surfaces of the teeth of a gear so as to provide a surface-hardened layer along said surface, the process comprising:

(1) causing relative traversing movement of an electrically energisable inductor head along the space between a pair of adjacent gear teeth, the inductor head having an external profile substantially matching the profile of the space defined between the gear teeth;

(2) guiding the traversing movement of the inductor head so as to maintain predetermined clearances between the outer surface of the inductor head and the root and flank surfaces of the pair of gear teeth, the clearance being a minimum between the inductor head and the root surface and varying in predetermined manner along the flank surfaces in such a way as to achieve heating along the flank and root surfaces to a substantially uniform predetermined temperature suitable for induction hardening; and

(3) directing coolant to the surfaces of the unheated flanks, the tips, the heated flanks and the root of the pair of gear teeth so as to achieve relatively rapid cooling of said surfaces:

in which:

(a) the entire gear is immersed in a tank of coolant;

(b) the coolant is a non-aqueous quenching agent;

(c) the height of the inductor head is less than the depth of the space between the root and tip surfaces of each pair of gear teeth; and

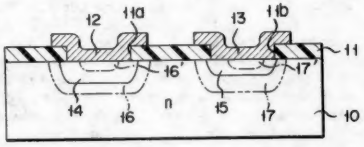
(d) the operating parameters of (i) the predetermined clearances, (ii) the rate of electrical energy supplied to, and the speed of traversing movement of the inductor head and (iii) the rate of cooling, are controlled in such a way as to form a substantially uniform thickness surface-hardened layer from tip to tip along the flank and root surfaces of the pair of gear teeth, said surface-hardened layer having an internal structure which provides the equivalent of a built-in compressive stress in its surface, at least in the region of each root surface and its transition to the flank surfaces.

4,589,936

METHOD FOR FABRICATING A SEMICONDUCTOR DEVICE BY CO-DIFFUSION OF ARSENIC AND PHOSPHORUS

Shigeru Komatsu, Kamakura, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Aug. 18, 1983, Ser. No. 524,213
Claims priority, application Japan, Aug. 19, 1982, 57-143719
Int. Cl.[4] H01L *21/385*
U.S. Cl. 148—188 **10 Claims**



1. A method of fabricating a semiconductor device, comprising the steps of:

selectively forming on a major surface of a silicon semiconductor substrate a diffusion source layer containing at least one n-type impurity selected from the group consisting of phosphorus and arsenic, and subsequently selectively doping said diffusion source layer with the other impurity, thereby forming at least two diffusion sources having different concentration ratios of phosphorus to arsenic; and

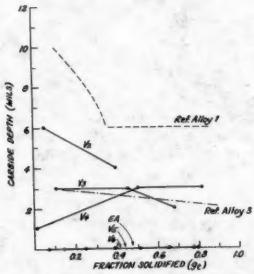
diffusing by a single heat treatment said n-type impurities from said diffusion sources into said semiconductor substrate to form a plurality of n-type diffusion regions which correspond to said diffusion sources and at least two of which have different diffusion depths.

4,589,937

CARBIDE REINFORCED NICKEL-BASE SUPERALLOY EUTECTICS HAVING IMPROVED RESISTANCE TO SURFACE CARBIDE FORMATION

Melvin R. Jackson, Schenectady; Michael F. X. Gigliotti, Jr., Scotia, and Swe-Wong Yang, Clifton Park, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Sep. 22, 1982, Ser. No. 421,634
Int. Cl.[4] C22C 19/03
U.S. Cl. 148—404 4 Claims



1. A unidirectionally solidified anisotropic composite article of manufacture being essentially free of surface nucleated carbides comprising:

(a) a nickel-base superalloy matrix and

(b) an aligned fibrous monocarbide eutectic reinforcing phase embedded in said matrix,

said article consisting essentially of vanadium and carbon; one or more elements selected from the group consisting of chromium, aluminum, cobalt, tungsten, molybdenum, hafnium, and zirconium; boron in an amount greater than an impurity amount up to 0.02%; and at least one element from the group consisting of tantalum and columbium such that, by weight,

$$V/(Ta+1.95Cb) \geqq \text{about } 0.23,$$

the balance being essentially nickel and incidental impurities.

4,589,938

SINGLE PHASE COPPER-NICKEL-ALUMINUM-ALLOYS

Joseph W. Drosdick, Clinton, N.Y., assignor to Revere Copper and Brass Incorporated, Stamford, Conn.

Filed Jul. 16, 1984, Ser. No. 631,359
Int. Cl.[4] C22C 9/06
U.S. Cl. 148—435 15 Claims

1. A copper alloy composition consisting essentially of nickel in an amount above 0.5 and less than 4 weight percent; aluminum in an amount above 0.5 and less than 3.8 weight percent; iron in an effective amount to stabilize the alloy during hot working or heat treating operations up to about 1.3 weight percent; and less than 0.5 weight percent of one or more of manganese, silicon, tin, zinc, and lead; with the balance being at least about 88 weight percent copper; said composition having a single phase crystal structure.

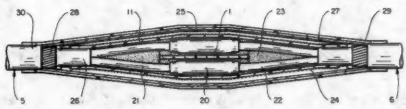
4. A copper alloy composition consisting of nickel in an amount above about 0.5 and less than 4 weight percent; aluminum in an amount above about 0.5 and less than 3.8 weight percent; iron in an amount between about 1.1 and 1.3 weight percent; less than 0.5 weight percent of one or more of manganese, silicon, tin, zinc and lead; and copper in an amount of at least about 88 weight percent; said composition having a single phase crystal structure.

4,589,939

INSULATING MULTIPLE-CONDUCTOR CABLES USING COATED INSERT MEANS

Manoochehr Mohebban, Belmont; Willem M. Versteegh, and Lester T. Toy, both of Fremont, all of Calif., assignors to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 581,395, Feb. 17, 1984, abandoned. This application Feb. 15, 1985, Ser. No. 702,117
Int. Cl.[4] H01B 13/22
U.S. Cl. 156—49 18 Claims



9. A method of insulating a joint between multiple-conductor, medium voltage power cables, each of said cables having at least three conductors each surrounded by a dielectric layer a portion of which has been removed to expose an end region of the conductor, the conductors of one cable being connected to the corresponding conductors of a second such cable, said method comprises:

(a) selecting an insert shaped such that when it is positioned between the conductors of the cables it lies between each of the conductors, at least the surface of said insert comprising a first void-filling material capable of forming a void-free interface with each conductor;

(b) positioning the insert between the conductors such that it lies between each of the conductors;

(c) positioning a dimensionally recoverable polymeric sleeve over the resulting assembly; and

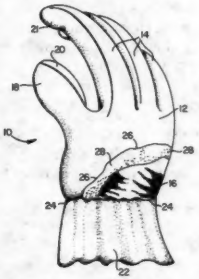
(d) causing the sleeve to recover.

4,589,940

METHOD OF MAKING FOAMED SLIP RESISTANT SURFACES

Michael D. Johnson, Coshocton, Ohio, assignor to Becton, Dickinson and Company, Paramus, N.J.

Division of Ser. No. 512,266, Jul. 11, 1983, Pat. No. 4,514,460, which is a continuation-in-part of Ser. No. 436,253, Oct. 25, 1982, Pat. No. 4,515,851. This application Dec. 10, 1984, Ser. No. 679,800
The portion of the term of this patent subsequent to Feb. 11, 2003, has been disclaimed.
Int. Cl.[4] B32B 31/12
U.S. Cl. 156—78 6 Claims



1. A method for producing a glove with a breathable, inexpensive, abrasion-resistant surface, characterized by the steps of

(a) selecting in a first selecting step a glove liner comprised of a web which is a member selected from the group

consisting of a fibrous non-woven web, a woven web, and a knitted web;

(b) selecting in a second selecting step a material to be applied as a foamed layer to at least one surface of said glove liner from said first selecting step;

(c) foaming said member selected from said second selecting step to an air content within the range of between about 40 and 95 percent;

(d) applying said member from said foaming step to said at least one surface of said glove liner; and

(e) curing said foamed member from said applying step.

4,589,941

METHOD OF FABRICATING DOUBLE-TOOTHED BELTS

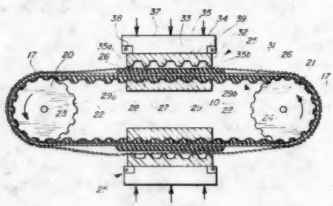
Toshihiro Tanaka; Keiichi Yoshimi, both of Kobe, and Shigeo Goto, Himeji, all of Japan, assignors to Mitsuboshi Belting Ltd., Kobe, Japan

Filed Jan. 30, 1985, Ser. No. 696,631

Claims priority, application Japan, Jan. 30, 1984, 59-16400

Int. Cl.[4] B29H *1/22*; B32B *31/06*

U.S. Cl. 156—140 **21 Claims**



10. The method of forming a double timing belt, comprising the steps of:

(a) forming a continuously looped timing belt preform having cog teeth disposed seriatim in one longitudinal face thereof;

(b) wrapping longitudinally about said looped preform opposite face a stretchable fabric layer;

(c) inserting between said fabric layer and said preform opposite face an insert of unvulcanized rubber without teeth having a length longitudinally of the preform corresponding to a preselected group of teeth of said preform;

(d) closing a tooth mold to cause said rubber insert to form vulcanized teeth bonded to said opposite face in accurate alignment with said group of teeth of said preform, and opening the mold; and

(e) repeating said steps (c) and (d) at successively different portions of the preform to provide teeth on said opposite surface along the entire longitudinal extent aligned with said teeth of the preform.

4,589,942

METHOD FOR LAMINATING A COMPOSITE ASSEMBLY

Robin Korinek, Kansas City, Mo., assignor to Transilwrap Company, Kansas City, Mo.

Filed Jul. 11, 1984, Ser. No. 629,714

Int. Cl.[4] B32B *31/00*

U.S. Cl. 156—148 **5 Claims**

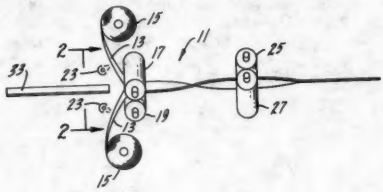
1. A method for laminating a composite assembly having films of plastic to provide such a composite assembly without appreciable transverse curl, the method including the steps of:

preparing two oppositely facing films, each having an outer layer of a tough abrasion resistant material and an inner layer of thermoplastic bonding resin,

heating the inner layers of thermoplastic bonding resins of the films, bringing the films together in a common plane,

laminating the films by passing them between first and second pairs of pressure rolls,

the first set of pressure rolls being tilted at an angle relative to the common plane of the films, and



the second set of pressure rolls being tilted relative to the common plane of the films an equal amount in the opposite direction of tilt of the first set of rolls.

4,589,943

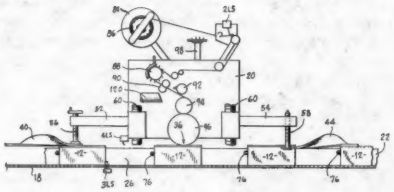
APPARATUS AND PROCEDURE FOR APPLYING ADHESIVE LABELS

John J. Kimball, Huntington Station, N.Y.; Harry V. Kirk, Kennesaw, Ga.; Richard L. Roule, Westport, Conn.; Richard C. Sennett, Annandale, Va., and Peter J. Sorbo, Stamford, Conn., assignors to American Bank Note Company, New York, N.Y. and Kirk-Rudy, Inc., Kennesaw, Ga.

Filed Mar. 8, 1984, Ser. No. 587,375

Int. Cl.[4] B26D *5/38*; B32B *35/00*; B65C *9/42*

U.S. Cl. 156—256 **32 Claims**



1. Apparatus for applying adhesive labels to upwardly facing surfaces of each of a multiplicity of articles arranged contiguously, with their upwardly facing surfaces substantially coplanar, in at least two parallel rows each including a plurality of the articles, using labels supplied as a continuous elongated web of flexible sheet material having a surface bearing an adhesive material and an opposite surface bearing at least two spaced-apart rows of label imprints, with the spacing between adjacent twos of imprints corresponding to a predetermined desired spacing between applied labels on adjacent rows of said articles, said apparatus comprising:

(a) means for defining a rectilinear path for concurrent lengthwise advance of said rows of articles;

(b) means for applying adhesive labels to the articles in said last-mentioned rows at a predetermined first locality in said path, said means including

(i) a cyclically movable endless surface disposed and dimensioned for simultaneous tangential engagement with the upwardly facing surfaces of adjacent articles in all said rows of articles at a predetermined locality in said path as said rows of articles advance together in said path, said endless surface being mounted above said path for movement in the same direction as said rows of articles at said predetermined locality, and

(ii) means for releasably holding individual labels on said endless surface at plural spaced rows of plural spaced sites positioned for register with the upwardly facing surfaces of the articles in said rows of articles as said

surface moves and said articles advance in said path, the spacing between adjacent rows of said sites corresponding to the spacing between adjacent rows of said imprints;

(c) means for delivering separated labels to said endless surface, at a second locality spaced from said predetermined locality, in positions to be held on said endless surface at said spaced sites and transported by said endless surface to said predetermined locality for contact with and transfer to the upwardly facing surfaces of articles in said advancing rows of articles, said delivering means including

(i) means for advancing the web longitudinally along a path leading toward the second locality,

(ii) means, positioned in said last-mentioned path, for slicing out and removing from the advancing web a longitudinal strip portion between said two rows of imprints, and

(iii) means, positioned in said last-mentioned path beyond the slicing means, for cutting the advanced web transversely to separate the rows of imprints into individual labels and delivering the individual labels to said sites at said second locality with the adhesive-material-bearing surfaces of the labels facing away from the endless surface; and

(d) drive means for undirectionally advancing said articles in said first-mentioned path and said endless surface at the same speed, such that said endless surface and the upwardly facing surfaces of the articles in said rows of articles have the same surface velocity and direction of movement at said predetermined locality.

4,589,944

PROCESS AND APPARATUS FOR PRODUCING A STRIP OF CORRUGATED CARDBOARD

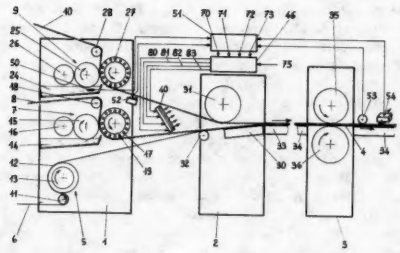
Mario Torti, Lyons, and Bernard Capdeboscq, St Just Chaleyssin, both of France, assignors to S. A. Martin, Villeurbanne, France

Filed Nov. 19, 1984, Ser. No. 672,979

Claims priority, application France, Nov. 17, 1983, 83 18280

Int. Cl.[4] B32B *1/00*

U.S. Cl. 156—359 **6 Claims**



1. An apparatus for producing a strip of corrugated cardboard consisting of two sheets of corrugated paper and at least a sheet of covering paper comprising

(a) a first machine (1) or gluer;

(b) a second machine (2, 3) or double face which ensures that said sheets of paper are brought into contact;

(c) a radiant panel (40) located between said two sheets of corrugated paper;

(d) said panel being supplied with electrical power via at least one power variator device (46);

(e) a processing device (51) controlling said power variator;

(f) a first device (50) providing information to said processing device, said device measuring the temperature of the glue coated on the said corrugations;

(g) a second device (52) measuring the quantity of glue deposited on the said corrugations;

(h) a third device measuring the speed of passage of the cardboard in the machine; and

(i) means to transmit information from said first, second and third devices to said processing device.

4,589,945

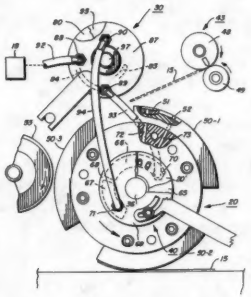
VACUUM SUPPLY CONTROL FOR A THREE PAD LABELLING HEAD MACHINE

Neil A. Polit, Crystal Lake, Ill., assignor to Xerox Corporation, Stamford, Conn.

Filed Jul. 5, 1985, Ser. No. 752,322

Int. Cl.[4] B65C *9/18, 9/42*

U.S. Cl. 156—497 **4 Claims**



1. In an article labelling apparatus having an article labelling station whereat articles are labelled, a supply of articles to be labelled, article transport means for transporting said articles to said article labelling station for labelling, a label supply station, and means to supply individual labels to said label supply station, the combination of:

(a) a rotary labelling wheel operatively disposed between said label supply station and said article labelling station, said wheel having three discrete labelling pads disposed about the periphery of said wheel, each of said pads having at least one vacuum holddown port open to the periphery thereof for picking up a label and bringing the label into labelling relationship with an article to be labelled at said article labelling station;

(b) a source of vacuum;

(c) a vacuum control valve for communicating the label holddown port of said pads with said vacuum source to cause said pads to pick up and bring a label from said label source to said article labelling station, said vacuum control valve terminating said vacuum communication to release the label and permit transfer of the label to said article; and

(d) a vacuum distributing valve interposed between said vacuum source and said vacuum control valve for interrupting communication between said vacuum control valve and said vacuum source for every other label pad whereby to cause every other label pad to skip a label while avoiding loss of vacuum through communication of the open label holddown port with the atmosphere.

4,589,946

PACKAGING APPARATUS

Edgar W. Borrow, Padnell Grange, Cowplain, Portsmouth, Hampshire, England

Filed Aug. 17, 1984, Ser. No. 641,850

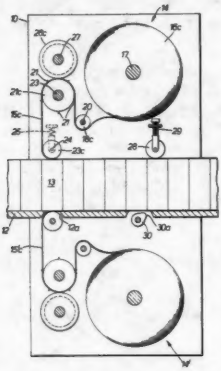
Claims priority, application United Kingdom, Aug. 19, 1983, 8322435

Int. Cl.[4] B32B *31/10, 31/18*

U.S. Cl. 156—513 **7 Claims**

1. Apparatus for securing together rectangular section car-

tons in batches characterised by a dispenser for adhesive tape and means for perforating the tape at a first set of spaced positions along the tape sufficiently to permit the tape to break



between batches when subjected to a first predetermined strain and at a second set of spaced positions sufficiently to permit the tape to break between individual cartons when subjected to a second predetermined strain greater than said first strain.

4,589,947

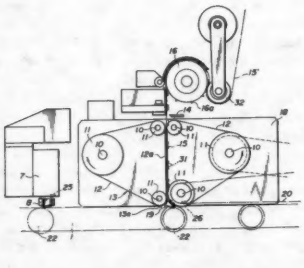
STRAW ADHERING APPARATUS FOR BEVERAGE VESSELS

Masaaki Tsuda, Tokyo, Japan, assignor to Kabushiki Kaisha Takara, Osaka, Japan

Filed Mar. 20, 1984, Ser. No. 591,522

Int. Cl.[4] B65B *19/34*; B32B *31/00*

U.S. Cl. 156—521 **3 Claims**



1. An apparatus for adhering a straw to a beverage vessel, comprising:

a main conveyor for carrying a plurality of beverage vessels along a predetermined path;

turret means, provided along the predetermined path of the main conveyor, for separating each of the plurality of beverage vessels from one another;

means, positioned downstream of the turret means along the predetermined path of the main conveyor, for applying an adhesive to a side of each of the plurality of beverage vessels being carried on the main conveyor;

means, arranged adjacent to but spaced from the main conveyor, for delivering a continuous strip containing a plurality to straws toward the plurality of beverage vessels being carried on the main conveyor, said delivering means being provided with a plurality of intermittent sprockets; said continuous strip being provided with a plurality of holes spaced for engagement with the intermittent sprockets of the delivering means;

means, positioned between the main conveyor and the delivering means, for cutting the continuous strip through the plurality of holes into a plurality of individual straw packs;

first belt means, arranged between the main conveyor and the cutting means, for vertically feeding each of the plurality of individual straw packs in a straight line perpendicular to the side of each of the plurality of beverage vessels on the predetermined path of the main conveyor; and

second belt means, arranged parallel to the predetermined path of the main conveyor, for retaining the plurality of individual straw packs in contact with the adhesive applied to the sides of the plurality of beverage vessels being carried on the main conveyor.

4,589,948

DOUBLE BAND PRESS OF MODULAR CONSTRUCTION

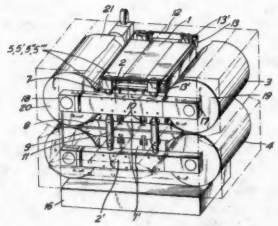
Kurt Held, Alte Str. 1, 7218 Trossingen 2, Fed. Rep. of Germany

Filed Sep. 13, 1983, Ser. No. 531,760

Claims priority, application Fed. Rep. of Germany, Sep. 14, 1982, 3234082

Int. Cl.[4] B30B *5/06, 15/34*

U.S. Cl. 156—555 **8 Claims**



1. A double band press of modular construction for use in laminating operations and adaptable to various processing operations and conditions, comprising an L-shaped stand comprising a horizontal base part and a vertical part extending upwardly from said base part, two pair of spaced drums with one pair located above the other, said drums being horizontally arranged with one end of each said drum being supported on said vertical part of said stand with the other end extending outwardly from the vertical part, two endless press band each extending around a different one of said pairs of drums so that said bands are disposed in opposed relation one above the other, said bands arranged to run in opposite directions, means in combination with said press bands and drums for effecting the laminating operation on materials passed between said press bands, and means arranged in cooperation with said stand for supporting said drums, said press bands and said means for effecting lamination, wherein the improvement comprises that said supporting means being capable of at least partial disassembly and said means for effecting lamination being replaceable for varying at least one of the length, height and width of the press, at least part of said supporting means being capable of at least partial disassembly at the ends of said drums spaced outwardly from said vertical part of said stand so that certain of said means for effecting lamination can be replaced, said supporting means comprises carrier supports located between said drums of each said pair of drums, upper and lower bearing supports elongated in the direction of movement of said press bands between said drums with said upper bearing supports supporting the upper ones of said drums and said lower bearing supports supporting the lower ones of said drums, said upper and lower bearing supports having vertically extending threaded bores extending therethrough transversely of the elongated direction thereof so that said bores in said upper

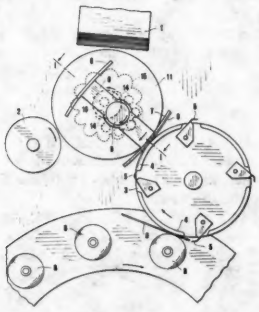
supports are in alignment with said bores in said lower bearing supports, upper and lower adjustment upwardly extending threaded spindles with said upper threaded spindles in threaded engagement with said bores in said upper bearing supports and said lower threaded spindles in threaded engagement with said bores in said lower bearing supports, a sleeve coupling arranged to be disassembled is disposed in threaded engagement with a pair of aligned said upper and lower threaded spindles for connecting the pair of said upper and lower threaded spindles each of which extends through a different said bearing support so that the interconnected said upper and lower threaded spindles rotate together and can adjust the space between said bearing supports, a pair of heating plates each associated with a different one of said press bands and extending along the portion of said press band adjacent the other said press band and between said drums over which said press band runs, means for displaceably supporting said heating plates, means for rotating each pair of interconnected said threaded spindles at the same time, a fixed bearing located in one end of each of said bearing supports and a stress bearing located in the other end of each of said bearing supports, whereby said sleeve coupling can be disassembled from said threaded spindles after said double band units are moved apart away from one another by operating said means for rotating said threaded spindles for replacing at least one of the press bands and the heating plates.

4,589,949

LABEL GRASPING AND TRANSFERRING DEVICE IN A LABELLING MACHINE FOR BOTTLES AND THE LIKE

Pietro Cavagnino, Viale Italia 44, I-14053 Canelli (Asti), Italy

Filed Feb. 14, 1985, Ser. No. 701,685
Claims priority, application Italy, Feb. 17, 1984, 67159 A/84
Int. Cl.[4] B65C *9/16*
U.S. Cl. 156—568 **8 Claims**



1. In a labelling machine intended to label bottles and the like, having a structure and on said structure a stationary store for labels, a rotating glueing roller, an applicator drum, a power source, and transmission means among said power source, said glueing roller and said applicator drum,

a device for grasping and transferring the labels from said store to said applicator drum, comprising:

a single transfer member having at least two curved plates rigidly connected to one another and uniformly spaced from one another, said curved plates having generatrixes parallel to the frontal plane of said label store of the machine, said transfer member being situated on said machine structure in the space comprised among said stationary store, said rotating applicator drum and said rotating glueing roller;

a shaft mounted on said machine structure, rotatable about an axis parallel to said generatrixes of said curved plates,

a crank support mounted onto said shaft, said transfer member being mounted freely rotatable on said crank support,

a crown of rollers connected in rigid rotational relationship to said transfer member, said crown of rollers comprising a number of idle rollers,

a stationary cam having a number of concave lobes, mounted on said machine structure and having a number of lobes higher than the number of said idle rollers, said idle rollers of the crown of rollers engaging the concave lobes of said cam,

the maximum radius of said cam being substantially equal to the outer radius of said crown of rollers plus the eccentricity of said crank support,

and transmission means inserted among said power source and said shaft,

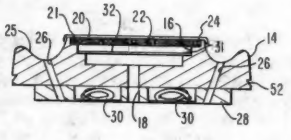
whereby each said plate of the transfer member, in a first phase of its movement, slides without substantial slip in contact with said glueing roller, thus becoming covered with glue; thereafter, in a second phase, it abuts by one of its ends against the first label of said store and then rolls on it, without substantial slip, thereby adhering to said first label and removing the same from said store; and finally, in a third phase, it abuts by one of its ends against said applicator drum and then rolls thereon without substantial slip, thereby transferring to said drum the conveyed label.

4,589,950

METHOD AND APPARATUS FOR ADHESIVE OR SEALANT APPLICATION

John Sekavec, Jr., 3600 Colorado Ave., Loveland, Colo. 80537

Filed Aug. 13, 1982, Ser. No. 407,723
Int. Cl.[4] B32B *31/00*
U.S. Cl. 156—578 **6 Claims**



1. A material applicator comprising:

a housing;

means defining an outwardly-opening cavity within the interior of said housing;

a port in said housing for admitting a liquid adhesive or sealant material into said cavity;

a generally flat pad of porous open-cell metal foam covering said opening of said cavity, the density of said foam being selected relative to the viscosity parameters of said material to extrude said material from said cavity through said foam and present a film of said material over the outwardly facing surface of said pad;

and means for continually reciprocating the pressure of delivery for said liquid into said cavity in order to maintain a predetermined desired thickness of said film outwardly exposed through said pad after each successive application of said material.

4,589,951

METHOD FOR ANNEALING BY A HIGH ENERGY BEAM TO FORM A SINGLE-CRYSTAL FILM

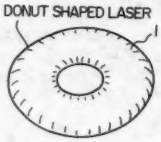
Seiichiro Kawamura, Tokyo, Japan, assignor to Fujitsu Limited, Kawasaki, Japan

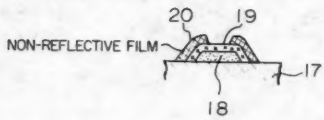
Continuation of Ser. No. 403,317, Jul. 30, 1982, abandoned. This application Dec. 19, 1984, Ser. No. 683,955
Claims priority, application Japan, Jul. 30, 1981, 56-120376
Int. Cl.[4] C30B *13/24*
U.S. Cl. 156—617 R **12 Claims**

1. A method for forming a single-crystalline semiconductor film on an amorphous insulator, comprising the steps of:

depositing a polycrystalline or amorphous semiconductor film on the amorphous insulator; and

scanning a high-energy beam over the polycrystalline or amorphous semiconductor film, the high energy beam having a thermal profile such that a region of the poly-





crystalline or amorphous semiconductor film irradiated by the high energy beam is melted and then cooled so as to crystallize in the direction from a central region toward an outer edge of a trailing edge of an area exposed to the high-energy beam, whereby a continuous single-crystalline film is formed.

4,589,952

METHOD OF MAKING TRENCHES WITH SUBSTANTIALLY VERTICAL SIDEWALLS IN SILICON THROUGH REACTIVE ION ETCHING

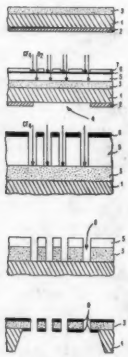
Uwe Behringer, Ammerbuch; Johann Greschner, Pliezhausen, and Hans-Joachim Trumpp, Stuttgart, all of Fed. Rep. of Germany, assignors to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 504,640, Jun. 15, 1983, abandoned. This application Nov. 9, 1984, Ser. No. 670,463

Claims priority, application European Pat. Off., Jul. 3, 1982, 85 105 957.3

Int. Cl.[4] H01L *21/308*

U.S. Cl. 156—628 **8 Claims**



8. A method of forming a rigid transmission mask comprising the steps of:

forming a silicon dioxide layer on a first surface of a silicon substrate;

forming a boron-doped silicon layer of a predetermined thickness and boron concentration in the opposite surface of the substrate;

forming a plurality of relatively large openings in said silicon dioxide layer and exposing the silicon thereunder;

forming sequentially on said boron-doped silicon layer a thick photoresist layer of a thickness between 2 μm and 9 μm and equal to twice the thickness of said boron-doped layer, a relatively thin silicon nitride layer and a relatively thin photoresist layer;

forming a pattern of narrow openings in each portion of the thin photoresist layer in correspondence with an opening in said silicon dioxide layer, at least one of said narrow openings having a lateral dimension of at least 0.3 μm;

transferring said patterns of openings to the silicon nitride layer by reactive ion etching the nitride in a carbon tetrafluoride atmosphere;

forming patterns of narrow openings having vertical sidewalls in the thick photoresist layer by etching, in an atmosphere containing oxygen at a pressure less than about 4μ bars, the surface of the thick photoresist layer exposed by said patterns of openings in the nitride layer;

forming patterns of trenches having substantially vertical sidewalls in the boron-doped silicon layer by reactive ion etching the boron-doped silicon through said patterns of openings in the thick photoresist layer at a vertical etch rate of 20–30 times higher than the lateral etch rate in an atmosphere containing carbon tetrafluoride with a very low fluorine concentration said low fluorine concentration being obtained by mounting said substrate on a fluorine-consuming cathode comprising a silicon plate arranged on the conductive cathode element of an ion etch reactor and maintaining in said reactor a carbon tetrafluoride flow rate of less than or equal to about 10 cc/min. at a pressure of about 40μ bar; and

removing said exposed silicon through said plurality of large openings;

whereby said patterns of trenches are converted into patterns of straight-walled apertures in said boron-doped layer.

4,589,953

MAGNETIC REFRIGERATOR

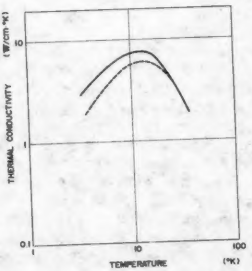
Hideki Nakagome, Yokohama, and Satoshi Yasuda, Kawasaki, both of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Division of Ser. No. 497,233, May 23, 1983, Pat. No. 4,509,334. This application Jan. 25, 1985, Ser. No. 694,772

Claims priority, application Japan, Aug. 31, 1982, 57-150939

Int. Cl.[4] C23F *1/00*; B44C *1/22*

U.S. Cl. 156—645 **5 Claims**



1. A method of manufacturing a working material for a magnetic refrigerator, said method comprising the steps of:

(a) machining a lump of single-crystal magnetic material to produce a block having a predetermined shape, the mag-

netic material being a material which radiates heat when magnetized and absorbs heat when demagnetized, and

(b) etching the block to remove a warp distortion layer produced on the surface thereof by the machining step.

4,589,954

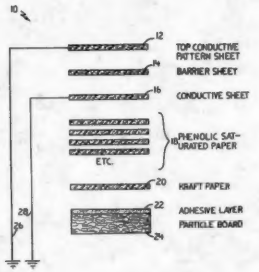
FIBROUS SHEET MATERIAL FOR CONDUCTIVE HIGH-PRESSURE LAMINATE

George R. Berbeco, West Newton, Mass., assignor to Charleswater Products, Inc., West Newton, Mass.

Division of Ser. No. 460,860, Jan. 25, 1983, Pat. No. 4,454,199, which is a continuation-in-part of Ser. No. 442,277, Nov. 17, 1982, Pat. No. 4,455,350. This application Apr. 20, 1984, Ser. No. 602,552

Int. Cl.⁴ D21F *11/00, 13/00;* **D21H** *1/12, 3/00*

U.S. Cl. 162—138 **12 Claims**



1. A fibrous sheet material suitable for use in a high-pressure laminate of improved electrical conductivity, which fibrous sheet material comprises a dried paper sheet material saturated with a heat-curable formaldehyde-type thermoset resin, and an electrically conductive amount of a quaternary ammonium compound.

4,589,955

FLUID RECOVERY SYSTEM

August R. Nukala, Galien; Arthur Perez, Buchanan, and Timothy L. Brumfield, Niles, all of Mich., assignors to RPR Filtration Systems, Inc., South Bend, Ind.

Filed Aug. 5, 1983, Ser. No. 520,798

Int. Cl.⁴ C10G *7/00, 31/09*

U.S. Cl. 196—114 **4 Claims**

1. A fluid recovery system for removing contaminants from a base fluid comprising:

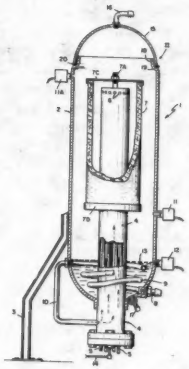
a vertically oriented vacuum vessel including a lower section, for accumulating said base fluid which has been vacuum distilled in said vessel, and a vacuum output line for removal of water vapor out said vacuum line;

a fluid heater unit disposed centrally of said vacuum vessel for heating fluid to be distilled, said heater unit including fluid outlet opening means at an upper section of said vacuum vessel;

a heat exchanger means within said vacuum vessel including heat exchange coils extending in said lower section of said vessel and immersed in said accumulated base fluid for exchanging heat between the accumulated fluid in said lower section and input fluid in said coils so as to preheat said input fluid and pre-cool said accumulated fluid, said input fluid being subsequently supplied to said fluid heater unit for additional heating prior to being distilled within said vacuum vessel to produce said base fluid;

fluid supply means for supplying fluid to be processed to said heater unit via said heat exchange coils; and

a dome-shaped cover for the vacuum vessel and an O-ring seal disposed between the cover and the top of the vessel, wherein the upper edge of the vacuum vessel includes a



radially offset portion forming an outwardly facing ledge, said O-ring seal resting on said ledge.

4,589,956

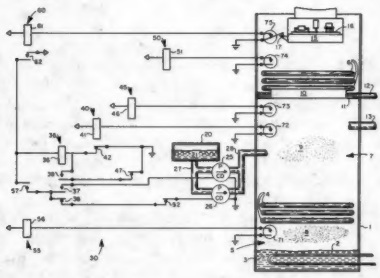
CONDENSATION HEATING FACILITY CONTROL SYSTEM

George R. Westby, Batavia, Ill., assignor to GTE Communication Systems Corporation, Northlake, Ill.

Filed May 2, 1984, Ser. No. 606,006

Int. Cl.⁴ B01D *3/00*

U.S. Cl. 202—170 **16 Claims**



1. A regulating system for use in a condensation heating facility having a vessel open to the atmosphere, said vessel including a heating means disposed in a bottom thereof and adapted to contain therein a body of hot saturated primary vapor and a blanket of secondary vapor interposed between the atmosphere and the primary vapor, said blanket of secondary vapor subject to loss through dispersion to the atmosphere, said control system comprising:

a reservoir of secondary liquid;

sensing means included within said vessel;

first dispensing means connected between said reservoir and said vessel, said first dispensing means including a first pump operated to dispense said secondary liquid at a first predetermined rate which is influenced by variations in atmospheric temperature and in the alternative by variations in electrical power supplied to said pump to said vessel to establish said blanket of secondary vapor;

second dispensing means connected between said reservoir and said vessel, said second dispensing means including a

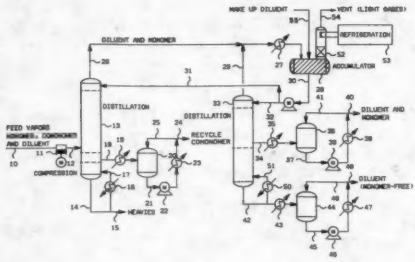
second pump operated to dispense said secondary liquid at a second predetermined rate which is not influenced by variations in atmospheric temperature and in the alternative and also not influenced by variations in electrical power supplied to said pump to said vessel to maintain said blanket of secondary vapor; and

control means connected to said first dispensing means, to said second dispensing means, and to said sensing means, said control means operated in response to a first condition of said secondary vapor detected by said sensing means to energize said first dispensing means and alternatively operated in response to a second condition of said secondary vapor detected by said sensing means to energize said second dispensing means.

4,589,957
MONOMER AND DILUENT RECOVERY

Fred T. Sherk, and Donald O. Hanson, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Filed Aug. 25, 1983, Ser. No. 526,254
Int. Cl.[4] B01D *3/00*
U.S. Cl. 203—75 **9 Claims**



1. A process for the separation and recovery of a three-component, hydrocarbon-containing feed comprising olefin monomer, 1-olefin comonomer, and hydrocarbon diluent in two distillation zones having a common accumulation zone wherein the overhead streams from both distillations are combined, condensed and the condensate formed and passed to the common accumulation zone is divided into a feed portion for the second distillation and a reflux portion for the first distillation which comprises

(a) passing said feed to a first distillation zone and therein subjecting same to distillation conditions sufficient to remove a bottoms stream comprising materials present in the feed heavier than said comonomer, a side stream comprising 1-olefin comonomer substantially free of other materials and an overhead vapor stream comprising olefin monomer and hydrocarbon diluent,

(b) condensing said overhead vapor stream to form a condensate comprising diluent and monomer and passing said condensate to an accumulation zone,

(c) removing condensate from said accumulation zone and passing at least a portion of said condensate as feed to a second distillation zone and passing the remainder of said condensate as reflux to an upper portion of said first distillation zone,

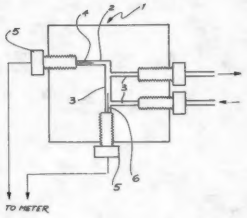
(d) subjecting said portion of condensate in said second distillation zone to distillation conditions sufficient to remove a bottoms stream comprising diluent substantially free of olefin monomer, a side stream comprising hydrocarbon diluent and olefin monomer, and a overhead vapor stream comprising hydrocarbon diluent and olefin monomer, and

(e) combining said overhead stream in (d) with said overhead stream in (a) prior to condensing in (b) and condensing the combined overhead streams and passing condensate thus formed to said accumulation zone in (b).

4,589,958
METHOD OF POTENTIOMETRIC DETECTION OF COPPER-COMPLEXING AGENTS

Peter W. Alexander, Maroubra, and Paul R. Haddad, Eastwood, both of Australia, assignors to Unisearch Limited, Kensington, Australia

Continuation-in-part of Ser. No. 484,703, Apr. 13, 1983, Pat. No. 4,518,463, which is a continuation of Ser. No. 249,373, Mar. 31, 1981, abandoned. This application Feb. 4, 1985, Ser. No. 697,935
The portion of the term of this patent subsequent to May 21, 2002, has been disclaimed.
Int. Cl.[4] G01N *27/46*
U.S. Cl. 204—1 T **5 Claims**



1. A method of detecting amino acids and other organic copper-complexing agents in a fluid, said method comprising the steps of:

providing a potentiometric electrode detector comprising copper metal electrode located within a flow through cell, said flow through cell having a volume in the range of 0.2 to 2 μl and being flow-coupleable to said fluid, said detector including a tubular inlet or material inert to the fluid to be analyzed, a reference electrode located within the cell downstream of said inlet, said copper metal electrode providing a voltage response to the amino acid or other organic copper-complexing agent to be detected;

passing said fluid to be analyzed through said detector; and

measuring said voltage response to thereby determine said amino acid or other organic copper-complexing agent.

4,589,959
PROCESS FOR ELECTROLYTIC TREATMENT OF METAL BY LIQUID POWER FEEDING

Syuji Nakamatsu, Kanagawa, and Takayuki Shimamune, Tokyo, both of Japan, assignors to Permelec Electrode Ltd., Kanagawa, Japan

Filed Dec. 12, 1984, Ser. No. 680,728
Claims priority, application Japan, Dec. 27, 1983, 58-244661
Int. Cl.[4] C25D *7/00*
U.S. Cl. 204—28 **1 Claim**

1. A process for the electrolytic treatment of metal with an electrolyte containing adipic acid or an ammonium salt thereof, comprising feeding power indirectly through the electrolyte without contacting an anode with the metal by the liquid power feeding method and using as an anode for said liquid power feeding an insoluble anode comprising a substrate of a corrosion-resistant metal and an electrode coating consisting of 40 mol % or more of iridium oxide and 60 mol % or less of the oxide of a metal selected from the group consisting of rhodium, titanium, tantalum, niobium, cobalt, manganese and mixtures thereof and formed on said substrate.

4,589,960

ACTIVATED METAL ANODES AND A PROCESS FOR MAKING THEM

Eberhard Preisler, Erftstadt; Heiner Debrodt, Nordendorf, and Dieter Lieberoth, Wertingen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. Germany

Filed Dec. 7, 1984, Ser. No. 679,289

Claims priority, application Fed. Rep. of Germany, Dec. 21, 1983, 3346093

Int. Cl.[4] C25D 5/50; C25B 11/00

U.S. Cl. 204—37.1 11 Claims

1. An improved metal anode for use in electrochemical processes, said anode having a core of a first metal being coated with a second metal wherein

(a) the first metal is a metal selected from the group consisting of zirconium, niobium, tantalum or titanium;

(b) the second metal is manganese;

(c) the manganese content at the anode surface area is greater than 16 weight %; and

(d) the manganese content of the first metal in the said core decreases from the anode surface area towards the interior of the anode from more than 16 weight % to 0 weight % so that the manganese content of the first metal reaches the value of 0 weight % at a distance corresponding to ¼ of the over-all diameter of the anode measured from the anode surface area.

4,589,961

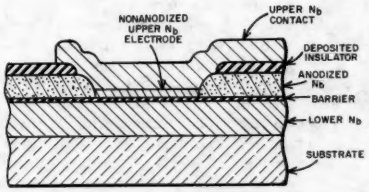
ALUMINUM MASK ANODIZATION WITH LIFT-OFF FOR PATTERNING JOSEPHSON JUNCTION DEVICES

Meir Gershenson, St. Paul, Minn., assignor to Sperry Corporation, New York, N.Y.

Filed Aug. 31, 1984, Ser. No. 646,270

Int. Cl.[4] H01L 39/22, 39/24

U.S. Cl. 204—15 36 Claims



1. An improvement to the Selective Non-Anodizing Process (SNAP) for patterning Josephson Junction Devices according both (1) masking of anodizing with a mask material harder and more durable that photoresist, and also (2) usage of the lift-off technique, said improvement method comprising:

starting with a workpiece tri-layer of top-layer superconductor on top of a barrier insulator layer on top of a superconductor layer upon a substrate; then

first depositing a layer of anodizable material which anodizable material is harder and more durable than photoresist; then

masking said layer of anodizable material with photoresist patterned to remain only in the regions where Josephson tunneling barriers will be formed; then

first etching said workpiece tri-layer with deposited and masked layer of anodizable material with an etchant which is selective to etch said anodizable material but not said top-layer superconductor, said masking plus said first etching leaving a mask combinatorially of said photoresist on top of said anodizable material only in the regions where Josephson tunneling barriers will be formed; then

anodizing said workpiece tri-layer with mask combinatorially of photoresist on top of anodizable material until said top-layer superconductor and also said layer of said anodizable material in the area not protected by said photoresist are both anodized; then

second depositing a layer of insulator material; then

removing said mask combinatorially of said photoresist on top of said anodizable material in accordance with the lift-off technique by second etching both anodized and remaining non-anodized of said anodizable material;

wherein what is produced by said starting, said depositing, said masking, said first etching, said anodizing, and said removing is well-defined islands of superconductor in a plane of anodized superconductor, each said island suitable to be an upper Josephson Junction electrode if upper contact electrodes are further conventionally formed by depositing of niobium, depositing of photoresist, masking, patterning by etching niobium, and removing the mask;

whereby firstly accorded by said starting, said depositing, said masking, said first etching, and said anodizing is that said anodizing has been masked in said regions where Josephson tunneling barriers will be formed not only by said photoresist, but also by said layer of anodizable material which is harder and more durable than photoresist, which anodizable material is a layer deposited immediately above said top-layer superconductor;

whereby secondly accorded by said starting, said depositing, said masking, said first etching, said anodizing, said second depositing and said removing is that entire said layers which are above said mask of anodizable material, including said layer of insulator material, are removed in the area above said mask by the lift-off technique when said anodizable material, both anodized and non-anodized, is removed.

4,589,962

SOLDER PLATING PROCESS AND SEMICONDUCTOR PRODUCT

Vijay M. Sajja, Fremont, Ranjan Mathew, San Jose and Jagdish Belani, Cupertino, all of Calif., assignors to National Semiconductor Corporation, Santa Clara, Calif.

Filed Jun. 3, 1985, Ser. No. 740,170

Int. Cl.[4] C25D 5/02, 5/34

U.S. Cl. 204—15 9 Claims

1. A method for solder plating metal leads on a plastic semiconductor package, said method comprising:

exposing the plastic semiconductor package to an organic acid selected from carboxylic acids and hydroxycarboxylic acids to remove metal oxide from the leads; and

electroplating tin or a tin/lead alloy onto the metal leads in a non-corrosive electrolyte wherein tin salts or tin and lead salts are present in sulfonic acid or citric acid.

4,589,963

PROCESS FOR THE CONVERSION OF SALTS OF CARBOXYLIC ACID TO THEIR CORRESPONDING FREE ACIDS

Robert A. Cipriano, and Bobby R. Ezzell, both of Lake Jackson, Tex., assignors to The Dow Chemical Company, Midland, Mich.

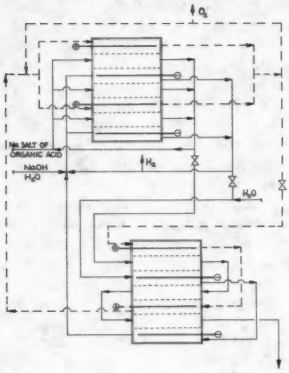
Filed Dec. 7, 1984, Ser. No. 679,339

Int. Cl.[4] C25B 3/00

U.S. Cl. 204—72 8 Claims

1. A method for preparing monobasic amino acids from their corresponding salts which consists essentially of carrying out an electrolytic conversion of said salt to said free acid in a central compartment formed essentially between a first sulfonic acid functional cation permselective membrane facing

the anode and a second membrane facing the cathode which is a cation permselective fluorocarbon having sulfonic and/or carboxylic acid functional groups, said membrane being spaced 1 mm or less apart.



4,589,964

PROCESS FOR GRAFT COPOLYMERIZATION OF A PRE-FORMED SUBSTRATE

Kenneth G. Mayhan, Irvine, Calif.; Robert A. Janssen, Eden Prairie, Minn., and William J. Bertrand, Sunnymead, Calif., assignors to American Hospital Supply Corporation, Evanston, Ill.

Continuation-in-part of Ser. No. 294,470, Aug. 20, 1981, abandoned, which is a division of Ser. No. 195,103, Oct. 8, 1980, Pat. No. 4,311,573. This application Feb. 14, 1984, Ser. No. 580,119

Int. Cl.[4] C08F *291/18*

U.S. Cl. 522—85 **7 Claims**

1. A process for producing a graft copolymer which comprises the graft polymerization of a water-soluble ethylenically-unsaturated compound, in aqueous solution, with a substantially insoluble pre-formed solid or semi-solid polymeric substrate having peroxide groups, including hydroperoxide groups, along the polymer chains thereof, wherein the improvement comprises carrying out aid polymerization in the presence of a variable valence metal ion in a reduced state capable of oxidizing to convert free hydroxyl radical to hydroxyl ion and thereby suppress homopolymerization of said monomer in said solution, and thereafter adjusting the pH of the reaction mixture by adding an acid or base to maintain a selected, substantially constant, acidic pH within the range of about 2 to 5 in the absence squaric acid at a selected reaction time and temperature to control the depth, density, and thickness of graft polymerization upon the surface of said preformed polymeric substrate.

4,589,965

METHOD FOR ELECTROBLOTTING

John H. Kreisher, Ridgefield, Conn., assignor to International Biotechnologies, Inc., New Haven, Conn.

Filed Nov. 14, 1984, Ser. No. 671,475

Int. Cl.[4] G01N *27/28*

U.S. Cl. 204—182.8 **12 Claims**

1. A method for rapid molecular transfer without immersion in a buffer solution which comprises: providing an electrophoretically resolved material in a gelatin sheet; placing said gelatin sheet in contacting relationship with an immobilizing material to form a sheet-material combination; sandwiching said sheet-material combination between two plate electrodes in direct face-to-face relationship therewith to form an assembly; and applying electric current to said electrodes to provide transfer of electrophoretically resolved material to the immobilizing material without immersion in a buffer solution and in short periods of time.

4,589,966

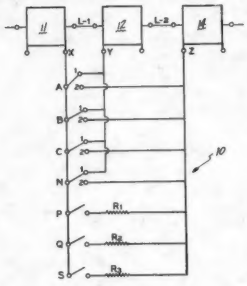
MEMBRANE CELL JUMPER SWITCH

James M. Ford, Cleveland, Tenn., assignor to Olin Corporation, Cheshire, Conn.

Filed Oct. 3, 1985, Ser. No. 783,709

Int. Cl.[4] C25B *9/04*; H01H *33/00*

U.S. Cl. 204—228 **14 Claims**



8. A method of bypassing the electric current of at least one electrolytic cell to be disconnected in a cell bank consisting of a plurality of adjacently positioned filter press membrane electrolytic cells connected in series via inlet bus bar and outlet bus bar connections and intercell connector links to an electrical power source, comprising the steps of:

(a) connecting a modular cell jumper switch having switch modules and resistor modules to the inlet bus bar connections of the cell to be disconnected and the immediately following cell and to the outlet bus bar connection of the immediately preceding cell the switch modules having a plurality of two position connecting switches movable between position one and position two, then switch modules and resistor modules further being connected in parallel and open;

(b) closing the resistor modules in the jumper switch to achieve a total jumper switch resistance in the combined resistor modules of $R_T=(E_o+C\cdot ka)/(KA-ka)$ so that the intercell connector link between the immediately preceding cell and the cell to be disconnected carries only an engineered positive residual current load where in the formula for the total jumper switch resistance E_o is the back EMF, KA is the electrical current load, ka is the engineered positive residual current load, and C is a constant for the cell to be disconnected representing the resistive cell component in the equation $E_{cell}=E_o+C\cdot ka$;

(c) removing the intercell connector link between the immediately preceding cell and the cell to be disconnected;

(d) moving the plurality of two position connecting switches in the jumper switch from position one to position two so the engineered positive residual current load stop flowing between the cell to be disconnected and the immediately preceding cell and flows from the immediately preceding cell to the immediately following cell;

(e) removing the intercell connector link between the cell to be disconnected and the immediately following cell;

(f) removing the cell jumper switch from the inlet bus bar of the cell to be disconnected; and

(g) removing the bypassed cell to be disconnected from the cell bank.

4,589,967

LINING FOR AN ELECTROLYSIS CELL FOR THE PRODUCTION OF ALUMINUM

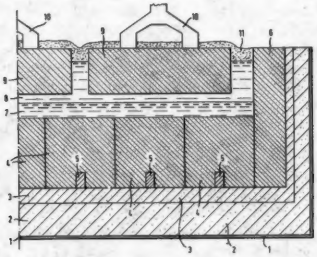
Karl W. F. Etzel, Bad Soden, Fed. Rep. of Germany, assignor to Sigri GmbH, Meitingen, Fed. Rep. of Germany

Filed Jul. 9, 1984, Ser. No. 628,807

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1983, 3327230

Int. Cl.[4] C25C *3/08;* C25B *11/12*

U.S. Cl. 204—243 R 11 Claims



1. Cell for the fusion-electrolytic production of aluminum which comprises

(a) a steel shell,

(b) graphite blocks lining the steel shell, said graphite blocks having a heat conductivity of 80 to 120 W/m·K, an electric resistivity from 6 to 13 μΩm and an accessible pore volume of at most 22%,

(c) an insulating layer between the steel shell and the lining of graphite blocks, said insulating layer containing at least two component layers with one component layer having a heat conductivity of 0.1 to 0.2 W/m·K and the other component layer having a heat conductivity of 0.8 to 1.2 W/m·K,

(d) said lining of graphite blocks and said insulating lining having a ratio thickness of 1.5 to 3.0, and

(e) cathodic current conductors set into the graphite blocks lining.

4,589,968

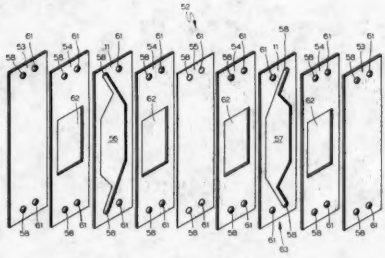
FILTER PRESS ELECTROCHEMICAL CELL WITH IMPROVED FLUID DISTRIBUTION SYSTEM

Joseph E. Toomey, Jr., Indianapolis, Ind., assignor to Reilly Tar & Chemical Corp., Indianapolis, Ind.

Continuation of Ser. No. 477,529, Mar. 21, 1983, abandoned. This application Nov. 9, 1984, Ser. No. 670,331

Int. Cl.[4] C25B *9/00, 15/08, 13/02*

U.S. Cl. 204—257 66 Claims



1. A filter press electrochemical cell arrangement including one or more cell units held within a frame, each unit comprising two electrodes and a fluid distributor plate,

said plate having two first holes therein and channel means for connecting said holes with opposite sides of a central opening in said plate, said holes corresponding to a supply and a discharge for fluid flowing through the reaction chamber defined by said central opening,

said channel means including a first portion for introducing a pressure drop in fluid flowing between said holes and said central opening and a second portion having diverging walls opening from said first portion into said central opening for delivering fluid from side to side and across the thickness of said chamber, the width of said second portion at said central opening being not greater than about 5 times its length nor less than about 2 times the thickness of said plate.

4,589,969

ELECTRODE FOR ELECTROLYSIS OF SOLUTIONS OF ELECTROLYTES AND PROCESS FOR PRODUCING SAME

Leonid I. Yurkov, Tashkentskaya ulitsa, 22, korpus 1, kv. 1; Vladimir B. Busse-Machukas, Izmailovsky bulvar, 37, kv. 27; Florenty I. Lvovich, I Nizhnemikhailovsky proezd, 16, kv. 55; Vladimir L. Kubasov, Kirovogradskava ulitsa, 4, korpus, 2, kv. 135, all of Moscow; Alexandr A. Uzbekov, Naberezhno-Kreschatitskaya ulitsa, 11, kv. 49, Kiev; Anatoly F. Mazanko, Stavropolskava ulitsa, 56, korpus 1, kv. 73, and Natalya S. Fedotova, ulitsa Sayanskaya, 6, kv. 143, both of Moscow, all of U.S.S.R.

Filed Oct. 12, 1984, Ser. No. 660,513

Int. Cl.[4] B05D *5/12;* C25C *7/02*

U.S. Cl. 204—290 F 3 Claims

1. An electrode for electrolysis of solutions of electrolytes comprising a substrate of a passivating metal; a coating applied onto said substrate and consisting of a mixture of oxides of ruthenium, titanium and tin at the following proportions, molar per cent:

ruthenium oxide	15–30
titanium oxide	25–55
tin oxide	30–60

4,589,970

APPARATUS FOR SELECTIVELY MEASURING IONS IN A LIQUID

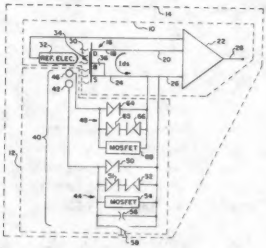
Hendrikus C. G. Ligtenberg, Nietap, and Albertus Veld, Roden, both of Netherlands, assignors to Cordis Europa N.V., Roden, Netherlands

Filed Aug. 16, 1984, Ser. No. 641,911

Claims priority, application Netherlands, Aug. 24, 1983, 8302963

Int. Cl.[4] G01N *27/30*

U.S. Cl. 204—406 14 Claims



1. Apparatus for selectively measuring ions in a liquid, said apparatus comprising a measuring circuit including a chemi-

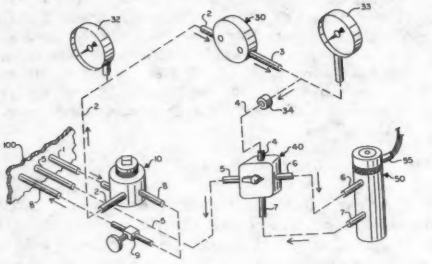
cally sensitive ion sensor in the form of an ion sensitive field effect transistor (ISFET), a reference electrode, and an amplifier, characterized in that said apparatus includes a protection system for said ISFET comprising a low-impedance contact, a protective element, and at least one electrode connectable to the liquid via said low-impedance contact and coupled to said ISFET by said protective element which has a low impedance to high voltages above the operative voltage range of said ISFET and a high resistance to low voltages below the operative voltage range of said ISFET and which is adapted to become operative outside the operative range of said ISFET.

4,589,971

MOISTURE ANALYZER

Donald P. Mayeaux, Prairieville, La., assignor to The Permutit Company, Paramus, N.J.

Filed May 29, 1984, Ser. No. 615,049
Int. Cl.[4] G01N *27/46*
U.S. Cl. 204—430 **12 Claims**



1. In combination, an apparatus for detecting and measuring the amount of moisture in a moisture-containing gaseous stream which utilizes a cell assembly characterized as a compartmented structure, a first compartment separated from a second compartment by a partitioning semi-permeable membrane through which moisture can be passed, which comprises

an open-end cell housing forming said first compartment, said housing including an enclosing wall, a gas inlet within said wall into which a sampled moisture-containing gas can be admitted, and a gas outlet within said wall through which the sampled gas can be discharged,

a cell bobbin assembly providing said second compartment, said cell bobbin assembly including a forward portion which is projected into the open-end of said cell housing, enclosed and detachably mounted therein, the cell bobbin carrying an electrical circuit, the external face of the forward portion of said cell bobbin assembly being provided with continuous circumferential grooves of helical orientation which wind about the central axis of said cell bobbin assembly and carry at least one pair of exposed thread-like wire electrodes which constitute a portion of said electrical circuit, and upon which can be disposed a hydroscopic electrolyte which is electrically conductive when wet and in contact with both wires of an electrode pair, the semi-permeable membrane which separates said first and second compartments one from the other being carried upon said forward face of the cell bobbin to cover said exposed wire electrodes, and said hydroscopic electrolyte, such that when a moisture-containing gas is admitted via the gas inlet and discharged via the gas outlet of said first compartment and contacted with an exposed side of the semi-permeable membrane within said first compartment moisture can be transported from said moisture-containing gas for contact with said hydroscopic electrolyte within said second compartment,

a direct current power source of voltage sufficient to electrolyze said hydroscopic electrolyte when wetted by moisture passed through said semi-permeable membrane from said first compartment to said second compartment,

current measuring means connected in circuit with said direct current power source for measuring the water content of said hydroscopic electrolyte as a function of the current delivered by said power source in electrolyzing said hydroscopic electrolyte,

a filter,

a pressure regulator connected in series with said filter,

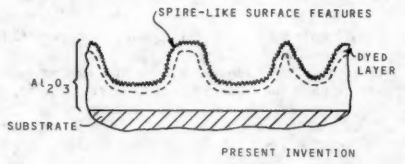
a four-way selector valve connected in series with said filter, said pressure regulator and to the gas inlet and gas outlet of said cell assembly, whereupon the moisture-containing sample gas can be passed through the circuit containing the filter and pressure regulator while by-passing the cell assembly, and alternately the moisture-containing sample gas can be passed serially through the circuit containing filter, pressure regulator and cell assembly.

4,589,972

OPTICALLY BLACK COATING WITH IMPROVED INFRARED ABSORPTION AND PROCESS OF FORMATION

Stephen M. Pompea, Denver; Derek W. Bergener, Lakewood, and Donald F. Shepard, Evergreen, all of Colo., assignors to Martin Marietta Corporation, Bethesda, Md.

Filed Jul. 30, 1984, Ser. No. 635,732
Int. Cl.[4] C25D *5/34, 5/44*
U.S. Cl. 204—29 **10 Claims**



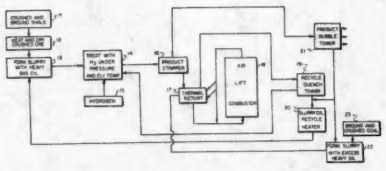
5. A process of making an object having a surface for absorbing infrared radiation and for reducing specular reflectance of infrared radiation comprising the steps of anodizing an object composed of an anodizable metal to provide an anodized surface on the object, dyeing the anodized surface, and reducing reflectance and improving resistance to atomic oxygen attack by sealing the anodized surface by contacting the surface with steam under a pressure of about 15 psig for about 30 minutes.

4,589,973

PROCESS FOR RECOVERING OIL FROM RAW OIL SHALE USING ADDED PULVERIZED COAL

Carl S. Minden, Salt Lake City, Utah, assignor to Breckinridge Minerals, Inc., Murray, Utah

Filed Jul. 15, 1985, Ser. No. 754,938
Int. Cl.[4] C10G *1/00, 1/02, 1/04;* G10B *53/06*
U.S. Cl. 208—410 **15 Claims**



1. A continuous process for treating raw oil shale to produce shale oil of improved quality and yield and reduced cost which comprises the following steps:

a. crushing and grinding the raw oil shale,

b. heating and drying the crushed and ground shale,
c. passing the heated and dried shale particles to a slurry mixer where they are mixed with hot heavy oil recycle.
d. passing the slurry into a pressurized hydropyrolysis chamber where it is treated with hydrogen under a pressure of 500 to 2000 psi and a temperature of 400 degrees C. to 475 degrees C. for a short residence time, and taking steps during this reaction to prevent the temperature from rising more than about 25 degrees C. above the aforementioned range,
e. discharging the hydropyrolysis reaction mixture into a product stripper wherein the product hydrocarbons and a portion of the recycle slurry oil is vaporized and passed to a separation column where the desired fractions are removed and heavy gas oil recovered,
f. mixing the heavy gas oil so recovered with pulverized coal particles to form a pumpable slurry to be charged to the high temperature zone of a thermal retort,
g. passing spent shale and slurry oil from the product stripper to a fluidized bed thermal retort in which a temperature gradient is maintained by introducing spent shale and coal char that has been burned in an air lift combustor into at least two different treatment zones, the upper zone being selected such that the temperature is sufficient to vaporize the remaining slurry oil, and the lower zone being selected such that the temperature is sufficient to thermally retort residual organic carbon and hydrogen remaining after hydropyrolysis, pyrolyze coal charged to the lower zone and to thermally crack the excess heavy oil charged to this zone of the reactor.
h. taking the combined gas and liquid product to a quench tower where the liquid product is recycled to the hydropyrolysis reactor and the heavy gas oil is recycled to the slurry mixer.
i. and discharging the spent shale and coal char at the bottom of the thermal retort chamber to the air lift combustor.

4,589,974

OPTICALLY ANISOTROPIC CARBONACEOUS PITCH AND PROCESS FOR PRODUCING THE SAME

Takayuki Izumi, Ohi, Japan, assignor to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 7, 1982, Ser. No. 415,382
Claims priority, application Japan, Sep. 7, 1981, 56-140782
Int. Cl.[4] C10C *3/00*; D01F *9/12, 9/20*
U.S. Cl. 208—22 **18 Claims**

1. A substantially homogeneous, optically anisotropic carbonaceous pitch for use in carbon fibers or the like, characterized in that the major portion of said pitch consists of a continuous, optically anisotropic phase, said optically anisotropic phase containing spherules of an optically isotropic phase having diameters ranging from about 1 μm to about 100 μm and dispersed in said optically anisotropic phase, the content of said optically isotropic spherules being up to about 20% on the basis of said pitch as a whole, said pitch containing substantially no optically isotropic spherules having a diameter of about 200 μm or more, said pitch containing at least about 30 wt% of a quinoline-soluble component, 20 to 50 wt% of a benzene soluble component, 15 to 40 wt% of an n-heptane insoluble but benzene soluble component, and 5 to 15 wt% of an n-heptane soluble component, and wt%s being based on said pitch as a whole, and said pitch having a softening point of from about 230° C. to about 320° C. and a carbon-to-hydrogen atomic ratio C/H of up to 2.0.

4,589,975

METHOD OF PRODUCING A PRECURSOR PITCH FOR CARBON FIBER

Kozo Yudate; Yukihiro Ōtsugi; Mamoru Kamishita, and Ken Nagasawa, all of Chiba, Japan

Filed Dec. 27, 1984, Ser. No. 686,651
Claims priority, application Japan, Mar. 10, 1984, 59-44817
Int. Cl.[4] C10C *3/00, 3/02*; D01F *9/12*
U.S. Cl. 208—44 **3 Claims**

1. In a method of producing a precursor pitch for carbon fiber by hydrogenating a tar pitch to obtain a hydrogenated pitch containing no free carbon and high molecular weight components, and then subjecting it to a heat treatment, the improvement which comprises carrying out said hydrogenation for a soft or middle pitch as the coal tar pitch, in the presence of tetralin as a solvent at a temperature of 400°–450° C., removing the tetralin and its insoluble components from the hydrogenated pitch, and after said removing step carrying out said heat treatment in an inert gas atmosphere at a temperature of 450°–500° C. and under a reduced pressure of 0.1–10 Torr, so as to obtain a low viscosity mesophase pitch containing 10–30% by weight of quinoline insoluble matter, and having 100% optically anisotropic texture as the precursor pitch.

4,589,976

HYDROCRACKING PROCESS EMPLOYING A NEW ZEOLITE, SSZ-16

Stacey I. Zones, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 425,786, Sep. 28, 1982, Pat. No. 4,508,837. This application Jan. 17, 1985, Ser. No. 692,945
Int. Cl.[4] C10G *47/16*
U.S. Cl. 208—111 **2 Claims**

1. In a process for hydrocracking a hydrocarbonaceous feed under hydrocracking conditions, the improvement comprising contacting a hydrocarbonaceous feed with a catalyst composition comprising a zeolite having a mole ratio of an oxide selected from silicon oxide, germanium oxide, and mixtures thereof to an oxide selected from aluminum oxide, gallium oxide, and mixtures thereof greater than about 5:1 and having the X-ray diffraction lines of Table 1.

4,589,977

ZEOLITE SSZ-19

Stacey I. Zones, San Francisco, Calif., assignor to Chevron Research Company, San Francisco, Calif.

Division of Ser. No. 494,244, May 13, 1983, Pat. No. 4,510,256. This application Jan. 17, 1985, Ser. No. 692,942
Int. Cl.[4] C10G *47/16*
U.S. Cl. 208—111 **2 Claims**

1. A hydrocracking process which comprises contacting a hydrocarbonaceous feed in the presence of hydrogen at hydrocracking conditions with a catalyst comprising a crystalline solid having a mole ratio of an oxide selected from silicon oxide, germanium oxide, and mixtures thereof to an oxide selected from aluminum oxide, gallium oxide, and mixtures thereof greater than about 6:1 and having the X-ray diffraction lines of Table 1.

4,589,978

CATALYST FOR REDUCTION OF SO_x EMISSIONS FROM FCC UNITS

Gary J. Green, Yardley, and Tsoung Y. Yan, Philadelphia, both of Pa., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Mar. 1, 1985, Ser. No. 707,310
Int. Cl.[4] C10G *11/00*
U.S. Cl. 208—113 **25 Claims**

1. In a process for reducing SO_x emissions from flue gas in a hydrocarbon catalytic cracking system wherein a cracking catalyst and an SO_x transfer catalyst are circulated between catalyst regeneration zone where sulfur oxides contained in said regeneration zone are reacted with said SO_x transfer cata-

lyst and a hydrocarbon cracking zone where hydrogen sulfide is formed by contacting said reacted SO_x transfer catalyst with a hydrocarbon stream, the improvement comprising operating said regenerator at a temperature of at least 700° C. and using as said SO_x transfer catalyst alumina and at least 1 wt. % of a rare earth mixture of cerium and lanthanum relative to said alumina.

4,589,979

UPGRADING HEAVY GAS OILS

Sam Ferguson, Sugar Land, and Darrell D. Reese, Beaumont, both of Tex., assignors to Nalco Chemical Company, Oak Brook, Ill.

Filed Aug. 22, 1985, Ser. No. 768,530
Int. Cl.[4] C10G *17/00, 45/00*
U.S. Cl. 208—263 **2 Claims**

1. A method of neutralizing the organic acidity in heavy gas oils to produce a neutralization number less than 1.0 whereby they are rendered suitable as lube oil feed stocks which consists essentially of treating said heavy gas oils with a neutralizing amount of monoethanolamine to form an amine salt with the organic acids and then heating the thus-neutralized heavy gas oil at a temperature at least about 25° F. greater than the boiling point of water and for a time sufficient to convert the amine salts to amides.

4,589,980

PROMOTERS FOR FROTH FLOTATION OF COAL

Robert O. Keys, Columbus, Ohio, assignor to Sherex Chemical Company, Inc., Dublin, Ohio

Filed Mar. 1, 1984, Ser. No. 585,176
Claims priority, application Canada, Oct. 12, 1983, 438830; Australia, Oct. 13, 1983, 20134/83; European Pat. Off., Oct. 13, 1983, 83630169.7
Int. Cl.[4] B03D *1/02*
U.S. Cl. 209—166 **16 Claims**

1. In a froth flotation process wherein solid coal particles are selectively separated under coal froth flotation conditions as the froth phase from remaining solid feed ash particles as an aqueous phase in the presence of a coal particle collector and a frother, the improvement characterized by the addition of an effective proportion of a hydrophobic, non-ionic promoter comprising a C_{10}–C_{30} fatty acid; an aliphatic ester of said fatty acid wherein when said aliphatic ester is an alkoxylated derivative, said derivative is a C_3 or higher alkoxylated derivative of said fatty acid; and mixtures thereof, said promoter being devoid of nitrogen atoms.

4,589,981

FLUIDIZED BED CLASSIFIER

Hari B. Barari, and Lance A. Mullins, both of Colorado Springs, Colo., assignors to Joy Manufacturing Company, Pittsburgh, Pa.

Filed Dec. 12, 1983, Ser. No. 560,730
Int. Cl.[4] B07B *3/02*
U.S. Cl. 209—474 **3 Claims**

1. Apparatus for classifying particles of differing specific gravities comprising:

an upper flat perforated plate;

means for feeding said particles onto said upper plate;

means for flowing a fluidizing medium upwardly through said upper plate so that said particles are partially fluidized and segregated into an upper fluidized floats fraction and a lower packed sinks fraction separated by an interface region;

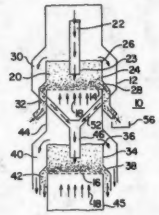
said feeding means positioned to discharge said particles directly into said interface region;

an upper peripheral housing, having an open top and an open bottom, for laterally supporting said particles above said upper plate, said upper housing having a first upper peripheral opening extending along the entire circumference of said upper housing for peripheral-discharging said floats fraction and being spaced from said upper plate, forming a first lower peripheral opening between said upper plate and said upper housing, extending along the entire circumference of said upper housing for peripheral-diischarging said sinks fraction;

a lower flat perforated plate disposed below said upper plate;

a lower peripheral housing having an open top and an open bottom, for laterally supporting particles above said lower plate, said lower peripheral housing having a second upper peripheral opening extending along the entire circumference of said lower housing for peripheral-discharging an upper refuse fluidized fraction and being spaced from said lower plate, forming a second lower peripheral opening between said lower plate and said lower housing extending along the entire circumference of said lower housing for peripheral-discharging a lower packed secondary fraction;

means for discharging particles from said apparatus;



means for directing one of said floats fraction and sinks fraction from one of the upper and lower peripheral openings, respectively, onto said lower plate, comprising a first annular region completely surrounding said upper plate, having sloped ramps for funneling particles to a first lower annular outlet region;

means for directing the other of said floats fraction and sinks fraction from the other one of the first upper peripheral opening and first lower peripheral opening to said discharge means comprising a second said annular region which funnels particles to a second said lower region; and

means for flowing a fluidizing medium upwardly through said lower plate so that the one of said floats fraction and sinks fraction directed onto said lower plate, segregates into said upper refuse fluidized fraction and said lower packed secondary fraction.

4,589,982

REMOVABLE POWER PACK PUMP ASSEMBLY

Allan H. Willinger, Englewood, N.J., assignor to Willinger Bros., Inc., Oakland, N.J.

Filed Apr. 4, 1984, Ser. No. 596,530
The portion of the term of this patent subsequent to Apr. 23, 2002, has been disclaimed.
Int. Cl.[4] E04H *3/16, 3/20*
U.S. Cl. 210—169 **15 Claims**

1. A removable power pack assembly for selective application to an aquarium filter and an aquarium vacuum, said assembly comprising:

a housing;

a cylindrical compartment contained in said housing and terminating in a neck portion depending from said housing, means defining an axial aperture at the distal end of said neck portion permitting the intake of water from an aquarium tank, and means defining a side aperture in said neck portion permitting the discharge of water from the cylindrical compartment;

a motor unit positioned in said housing and comprising a stack of stator laminations defining a bore therein for receiving said cylindrical compartment, and

having a motor coil crossing the laminations;

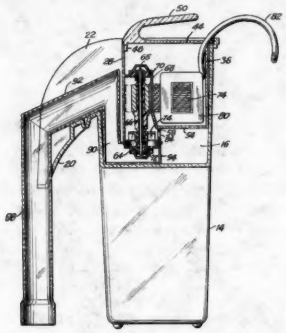
a pump impeller unit positioned in said compartment and magnetically coupled to said motor unit for rotation upon energization of the motor coil to pump aquarium water into the axial aperture where the water will then be discharged from the side aperture;

cover means secured onto said housing, and

means for temporary coupling of said housing to said filter and to said vacuum, whereby the housing can be selectively utilized to operate both the filter and the vacuum, as needed.

11. An aquarium vacuum for movement along an aquarium tank to remove debris from the aquarium water, comprising:

a tubular body member having a lower supply end for the ingress of debris laden aquarium water, an upper pumping



end for drawing the aquarium water into the body member, and means defining a discharge aperture through a peripheral side wall for connection to a filter bag, and

a removable power pack unit comprising an outer casing having a depending neck portion for insertion into the body member, and having means defining an inlet port in flowing registry with the pumping end, and means defining an outlet port in flowing registry with said discharge aperture, a motor unit in said casing, and a pump impeller unit extending into said neck portion and magnetically coupled to said motor unit for rotation thereby, to draw the debris laden aquarium water into the inlet port and discharge it into the filter bag.

4,589,983

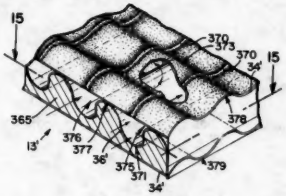
FLUID FILTERING DEVICE

Robert M. Wydevan, Eagan, Minn., assignor to Donaldson Company, Inc., Minneapolis, Minn.

Continuation-in-part of Ser. No. 317,275, Nov. 2, 1981, Pat. No. 4,410,427. This application Oct. 17, 1983, Ser. No. 542,362

Int. Cl.[4] B01D *27/06*

U.S. Cl. 210—317 **26 Claims**



1. A composite filter media for use in a fluid filter for removing particulate matter comprising:

a first sheet of corrugated filter media;

a second sheet of corrugated filter media;

said sheets being nested with each other to create a layered composite so that alternate sheets of corrugated media are in contact with each other over their surfaces with their respective axis of corrugation at substantially right angles with opposing surfaces of said sheets defining a first plurality of parallel longitudinal flutes with adjacent flutes separated by said first sheet and with opposing surfaces of said sheets defining a second plurality of parallel longitudinal flutes transverse to said first plurality of flutes with adjacent flutes in said second plurality separated by said second sheet; said second plurality of flutes connecting every other one of said flutes of said first plurality in fluid flow communication;

sealant means applied to said one end of said composite to block every other one of said longitudinal flutes of said first plurality;

sealant means applied to said opposite end of said composite to block the ends of said longitudinal flutes of said first plurality which are open on said one end of said composite whereby fluid may be filtered by passing through adjacent flutes; and

means for blocking fluid flow out of said second plurality of flutes.

2. A fluid filter for removing particulate matter comprising:

a first roll of corrugated filter media having generally parallel corrugations;

(b) a second roll of corrugated filter media having generally parallel corrugations;

said rolls being nested with each other to create a composite roll with corrugations of adjacent filter media being generally transverse to one another with opposing surfaces of said media defining a plurality of longitudinal hollow passages extending through said composite roll from one end thereof to the other and a plurality of transverse passageways transverse to said longitudinal hollow passages, said longitudinal hollow passages being formed in two spiral series, one surface of said longitudinally corrugated media being part of one series and the remaining surface being part of said other series of passages;

(c) sealant means applied to one of said spiral series of passages on one end of said composite roll for blocking fluid entry and egress from said series at that end; and,

(d) sealant means applied to the other of said spiral series of flutes on the other end of said composite roll for blocking entry and egress of fluid from said series at said other end.

4,589,984

APPARATUS FOR SEPARATING FROM EACH OTHER THE COMPONENTS OF A MIXTURE OF OIL, WATER AND SOIL

Hubrecht L. Legrand, Populierenlaan 6[4], 3735 LH Bosch En Duin, and Hendrik J. Ankersmit, Laan van Borgele 7, 7414 GS Deventer, both of Netherlands

Filed Aug. 20, 1984, Ser. No. 642,374

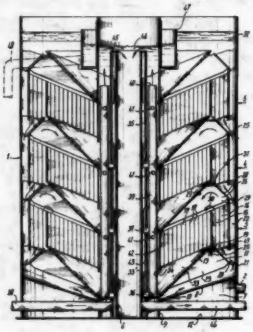
Claims priority, application Netherlands, Aug. 22, 1983, 8302941

Int. Cl.[4] B01D *17/028*

U.S. Cl. 210—522 **14 Claims**

1. An apparatus for continuously separating from each other the components of a mixture of water, oil and soil by gravitational segregation, which apparatus consists of a vessel provided with a supply pipe in its lower part to supply the mixture to be treated, a separate discharge outlet for each of oil, water and soil, and one or more separation chambers, wherein the vessel is provided with a receiver chamber (7) into which the supply pipe (2) leads, said receiver chamber (7) having a volume large enough to slow down the speed of flow of said mixture supplied by said supply pipe (2), a supply chamber (11) above and fluidly connected to the receiver chamber (7) and wherein each separation chamber comprises a first bundle of vertically arranged parallel plates (16) having passages therebetween, said supply chamber (11) having an opening (19) in its upper surface connected to said separation chamber (3) at an inlet to the openings of said passages for said first bundle (16), a second bundle of parallel plates (17) having vertical passages

situated in said separation chamber (3) and being separated from said first bundle of plates (16) by a separating wall (15), a reversing chamber (26) situated above said first and second bundles (16,17), said reversing chamber (26) having inclined top walls (27,28) extending from the uppermost portions of the farthest apart ends of said first and second bundles (16,17) to a point above the separating wall (15) and forming an outlet



opening (13) through which oil is discharged, and an inclined floor located beneath the vertical plates of said second bundle (17) and forming a discharge chamber (33), said inclined floor extending from said separating wall (15) to a discharge opening where a guide plate (36) adjoining said inclined floor (13) is connected to the soil discharge outlet and an outlet opening (34) is connected to the water discharge outlet.

4,589,985

POLYELECTROLYTE AND SURFACTANT COMPOSITIONS FOR CONTROLLING ALKALINE EARTH METAL SCALES

Monica A. Yorke, Coraopolis, Pa., assignor to Calgon Corporation, Pittsburgh, Pa.

Filed Dec. 3, 1984, Ser. No. 677,660

Int. Cl.⁴ C02F *5/14*

U.S. Cl. 210—699 **2 Claims**

1. A method of inhibiting the precipitation and deposition of alkaline earth metal scales including calcium carbonate in an aqueous system having a pH of at least 8, comprising adding to said system 0.1 to 100 ppm of (a) a water-soluble anionic polyelectrolyte selected from the group of copolymers containing from about 95 mole percent to about 25 mole percent acrylic acid or methacrylic acid and containing from about 5 mole percent to about 75 percent 2-acrylamido-2-methylpropyl sulfonic acid or 2-methacrylamido-2-methylpropyl sulfonic acid, and salts of these polymers; and (b) an anionic surfactant selected from octylphenoxy polyethoxy ethyl phosphate, and sodium or potassium salts thereof, wherein the anionic polyelectrolyte/anionic surfactant ratio ranges from 50:1 to 1:5, by weight, and wherein the molecular weight of said anionic polyelectrolyte ranges from about 1000 to about 20,000.

4,589,986

POOL CLEANER

Paul Greskovics, Manhattan Beach, and Donald R. Chivens, Northridge, both of Calif., assignors to Alopex Industries, Inc., San Marcos, Calif.

Division of Ser. No. 574,293, Jan. 26, 1984, Pat. No. 4,558,479. This application May 21, 1985, Ser. No. 736,369

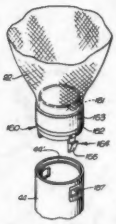
Int. Cl.⁴ E04H *3/20*

U.S. Cl. 210—483 **4 Claims**

1. For use with a pool cleaner having a vacuum system including a suction mast having an open end and a pair of generally opposed openings formed in the suction mast adjacent the mast open end, a collection bag assembly comprising:

a debris collection bag having an open end; and

means mounted on said collection bag at said open end for removable attachment of said collection bag to said suction mast, said attachment means including a pair of opposed latch clips for depression toward one another and oriented to extend into said suction mast in alignment with said mast openings, said latch clips having outwardly projecting tabs for releasable locked reception into said mast openings to secure said bag onto said suction mast.



4,589,987

SEPARATING ANIMAL CELLS FROM A LIQUID CULTURE

Andrew C. Kenney, Windsor, England, assignor to Celltech Limited, Slough, Berkshire, United Kingdom

Filed Apr. 29, 1985, Ser. No. 728,294

Claims priority, application United Kingdom, May 2, 1984, 8411192

Int. Cl.⁴ C02F *1/54*; C12N *1/02*

U.S. Cl. 210—725 **6 Claims**

1. A process for separating animal cells or animal cell debris from a liquid culture of animal cells comprising the steps of flocculating the animal cells or animal cell debris by mixing an effective amount of polygalacturonic acid with the culture to cause flocculation of the animal cells or animal cell debris and separating the flocculated animal cells or animal cell debris from the liquid culture.

4,589,988

SOFTENER-CONTAINING WASHING AGENT

Hans-Peter Rieck, Hofheim am Taunus; Hans-Jürgen Kalz, Liederbach; Adolf May, Hofheim am Taunus; Jochen M. Quack, Eppstein, and Hans-Walter Bücking, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

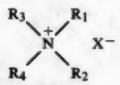
Filed May 2, 1985, Ser. No. 729,650

Claims priority, application Fed. Rep. of Germany, May 4, 1984, 3416472

Int. Cl.⁴ D06M *1/02*

U.S. Cl. 252—8.8 **7 Claims**

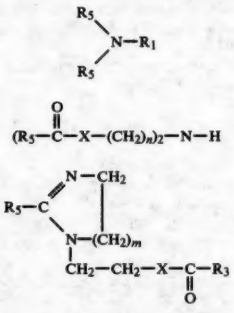
1. A softener-containing washing agent which contains 0 to 10% by weight of a quaternary ammonium compound of the formula



where R_1 and R_2 can be identical or different and denote hydrogen, C_1–C_4-alkyl, C_2–C_3-hydroxyalkyl or benzyl, R_3 denotes hydrogen, C_1–C_{22}-alkyl, C_2–C_4-hydroxyalkyl or benzyl, R_4 denotes C_1–C_{22}-alkyl, C_4–C_{22}-alkoxyethyl or

C_4–C_{22}-alkylphen-oxyethyl, and X denotes an anion, and 1 to 30% by weight of a softener system comprising

(a) 10 to 90% by weight of a compound of the formula



where R_5 denotes C_6–C_{22}-alkyl, C_4–C_{22}-alkoxyethyl or C_4–C_{22}-alkylphenoxyethyl, n denotes a number from 1 to 12, m denotes 1 or 2, and X denotes NH or O R_1 has the above-mentioned meaning, and

(b) 90 to 10% by weight of a crystalline alkali metal silicate from the group of the phyllosilicates of the formula

$$Me_2Si_xO_{2x+1}\cdot yH_2O$$

where Me denotes an alkali metal ion or a proton, x denotes a number greater than 7, and y denotes a number smaller than 7 x.

4,589,989

LAUNDRY SOFTENER CONCENTRATE

Karl-Hans Müller, Bruchköbel, and Manfred Diehl, Frankfurt, both of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Continuation of Ser. No. 555,797, Nov. 28, 1983, abandoned. This application Nov. 16, 1984, Ser. No. 672,164

Claims priority, application Fed. Rep. of Germany, Nov. 27, 1982, 3243983

Int. Cl.[4] C11D *1/62, 7/02*

U.S. Cl. 252—8.75 **21 Claims**

1. A laundry softener concentrate which comprises a mixture of at least one laundry softener and synthetic spray dried precipitated silicon dioxide, wherein the laundry softener is a cationic nitrogen-containing compound selected from the group consisting of a quaternary ammonium compound and an amine salt, said compound containing one or two straight-chain organic residues containing at least 8 carbon atoms, one of said residues containing from 12 to 22 carbon atoms.

4,589,990

MIST LUBRICANT COMPOSITIONS

Eugene R. Zehler, Cincinnati, Ohio, and Bruce J. Beimesch, Crescent Springs, Ky., assignors to National Distillers and Chemical Corporation, New York, N.Y.

Filed Jun. 21, 1985, Ser. No. 747,463

Int. Cl.[4] C10M *161/00*

U.S. Cl. 252—56 S **17 Claims**

1. An improved lubricant composition suitable for misting comprising:

(1) 45 to 95 parts by weight of a synthetic ester having a viscosity of 15 to 300 centistokes at 40° C. and selected from the group consisting of

(a) polyol esters derived from an aliphatic polyol having from 2 to 8 hydroxyl groups and 3 to 12 carbon atoms and an aliphatic monocarboxylic acid or mixture of aliphatic monocarboxylic acids having from 5 to 20 carbon atoms;

(b) trimellitate esters derived from trimellitic acid or trimellitic anhydride and an aliphatic alcohol having from 5 to 16 carbon atoms; and

(c) polymeric fatty acid esters derived from a polymeric fatty acid containing 75% or more C_{36} dimer acid and a $C_{2\text{-}13}$ mono-functional alcohol;

(2) 8 to 40 parts by weight, on a 100% polymer basis, polyisobutylene having an average molecular weight from 4,000 to 10,000; and

(3) 0.1 to 1 part by weight, on a 100% polymer basis, polyisobutylene having an average molecular weight from 25,000 to 300,000; and said composition having a viscosity of 125 to 750 centistokes at 40° C.

4,589,991

PROCESS FOR THE SOLUBILIZATION OF MERCAPTOBENZOTHIAZOLE IN A LUBRICATING OIL COMPOSITION

Jack Ryer, East Brunswick; Chung Kun Shih, Scotch Plains, and John E. Williams, Cranford, all of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

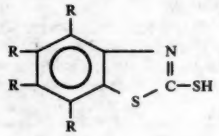
Filed Jul. 1, 1985, Ser. No. 749,989

Int. Cl.[4] C10M *135/36*

U.S. Cl. 252—47 **23 Claims**

1. A process for preparing an amine salt solution of a substituted or unsubstituted mercaptobenzothiazole solubilized at room temperature and adapted for compatible admixture into a lubricating oil composition which comprises:

(1) reacting to form said salt, in the absence of an oxidizing agent, at least one mercaptobenzothiazole represented by the structural formula:



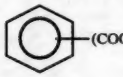
(I)

wherein each R independently represents hydrogen, alkyl, aryl, cycloalkyl, aralkyl or alkaryl; with at least one amine represented by the structural formula:

$$NR_1R_2R_3 \qquad \text{(II)}$$

wherein R_1 and R_2 independently represent hydrogen or about C_1 to C_{20} alkyl, and R_3 represents alkyl or alkenyl having from about 6 to about 25 carbon atoms; and wherein the molar ratio at which said amine and mercaptobenzothiazole are reacted is from about 1.1:1 to about 0.7:1;

(2) admixing the amine salt prepared in accordance with Step (1) with at least one solvent in a manner and under conditions sufficient to render said salt soluble in said solvent at room temperature, said solvent being represented by the structural formula:



(IV)

wherein n represents a number of from 1 to 3, and each R_8 independently is selected from the group consisting of alkyl, cycloalkyl, aryl, aralkyl and alkaryl.

4,589,992

NEW SALTS USEFUL AS CORROSION INHIBITORS

Emyr Phillips, Sale, and David Wilson, Tyldesley, both of England, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Oct. 17, 1984, Ser. No. 661,624
Claims priority, application United Kingdom, Oct. 19, 1983, 8327911
Int. Cl.[4] C10M *129/40, 133/08*
U.S. Cl. 252—75 8 Claims

1. A composition having corrosion-inhibition properties which comprises

(a) a major proportion of a non-aqueous functional fluid; and

(b) an effective amount of a corrosion inhibitor of a salt of formula I

$$Y—NH_3{}^+RCO_2{}^- \quad (I)$$

in which Y is a group of formula $R^1XCH_2CH(OH)CH_2$—, R and R^1 are the same or different, R^1 is a straight- or branched chain alkyl group having from 1 to 18 carbon atoms, a straight- or branched chain alkenyl group having from 2 to 18 carbon atoms, a cycloalkyl group having from 4 to 12 ring carbon atoms, an aryl group having 6–10 ring carbon atoms, or an aralkyl group having from 7 to 10 carbon atoms; R is a straight- or branched chain alkyl group having from 7 to 18 carbon atoms, a straight- or branched chain alkenyl group having from 2 to 18 carbon atoms, a cycloalkyl group having from 4 to 12 ring carbon atoms, an aryl group having 6–10 ring carbon atoms, or an aralkyl group having from 7 to 10 carbon atoms; and X is O, CO_2, NR^2 or R^2 is hydrogen, a straight- or branched chain alkyl group having from 1 to 18 carbon atoms or an alkenyl group having from 2 to 18 carbon atoms.

4,589,993

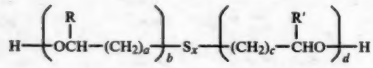
POWER TRANSMISSION SHIFT FLUIDS CONTAINING TWO-COMPONENT FRICTION MODIFIER ADDITIVE

William K. S. Cleveland, Roselle; Jack Ryer, East Brunswick, and Harold E. Deen, Cranford, all of N.J., assignors to Exxon Research & Engineering Co., Florham Park, N.J.

Continuation of Ser. No. 453,121, Dec. 27, 1982, abandoned.
This application Nov. 16, 1984, Ser. No. 672,420
Int. Cl.[4] C10M *129/16, 137/02, 135/22*
U.S. Cl. 252—78.5 7 Claims

1. A power transmission shift fluid composition comprising a mineral oil base containing a two-component additive in an amount effective to improve the friction characteristics of the fluid composition, the first component being (i) a succinate ester formed by the reaction of:

(a) a thio bis-alkanol of the formula:



wherein R and R′ each independently may be hydrogen, methyl or ethyl, x may be 1–4, and a, b, c, d, each may be independently 1–3, with (b) 1 to 2 moles, per mole of the thio-bis-alkanol, or an aliphatic hydrocarbon-substituted succinic acid or anhydride wherein the aliphatic hydrocarbon group contains from 12 to 50 carbon atoms, and the second component being (ii) a phosphite diester of the formula

$$(R''O)_2P(O)H$$

where R″ is an alkyl or alkenyl group of 6 to 20 carbon atoms.

4,589,994

LIQUID FOOT TREATMENT COMPOSITION

Roger E. Moseman, 19400 Redwing Blvd., Hastings, Minn. 55033

Filed Dec. 17, 1984, Ser. No. 682,656
Int. Cl.[4] C11D *3/48, 9/50*
U.S. Cl. 252—107 16 Claims

1. An aqueous concentrate effective to clean and deodorize feet consisting essentially of:

(a) water;

(b) about 15–35% of a mixture of anionic surfactants comprising

(i) an alkylated aromatic sulfonate;

(ii) a fatty alcohol sulfate;

(iii) a fatty acid salt; and

(iv) a fatty alcohol(ethylenoxy)sulfate wherein the salts (i)–(iv) are present in a weight ratio of about 1:2–5:-10–20:25–35 respectively;

(c) about 0.5–7.5% of a C_{10}–C_{20}-alkyl-di(lower)alkylamine oxide;

(d) about 0.1–10% of an anti-fungal phenolic compound; and

(e) about 0.1–10% of a terpene-rich oil.

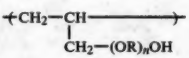
4,589,995

MALEIC ACID COPOLYMER, PRODUCTION THEREOF AND SCALE-PREVENTING AGENT CONTAINING THE SAME

Yasuhisha Fukumoto, Wakayama; Noboru Moriyama, Utsunomiya, and Takashi Itoi, Tochigi, all of Japan, assignors to Kao Corporation, Tokyo, Japan

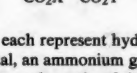
Filed Feb. 28, 1984, Ser. No. 584,427
Claims priority, application Japan, Mar. 25, 1983, 58-50006
Int. Cl.[4] C02F *5/10;* C07C *67/04, 69/593*
U.S. Cl. 252—180 3 Claims

1. A maleic acid copolymer which comprises repeating structural units of the formula (I):



(I)

wherein OR represents an oxyalkylene group of 2 or 3 carbon atoms and n represents an integer of from 1 to 50, and repeating structural units of the formula (II):



(II)

wherein X and Y each represent hydrogen, an alkali metal, an alkaline earth metal, an ammonium group or an organic amino group, wherein the molar ratio of the total number of units of formula (I) to that of units of formula (II) ranges from 5/100 to 50/100, and the number average molecular weight is from 400 to 20,000.

3. A method for the prevention of deposition of scale which comprises adding to water, in an amount effective to prevent scale from depositing on surfaces in contact with the water, the maleic acid copolymer as defined in claim 1.

4,589,996

LIQUID CRYSTALLINE CARBONIC ACID ESTERS AND LIQUID CRYSTAL COMPOSITIONS CONTAINING THE SAME

Hiromichi Inoue; Shinichi Saito; Kanetsugu Terashima; Takashi Inukai, all of Yokohamashi, and Kenji Furukawa, Yokosukashi, all of Japan, assignors to Chisso Corporation, Osaka, Japan

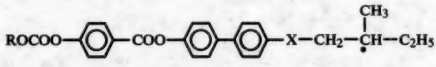
Filed Aug. 28, 1984, Ser. No. 645,097

Claims priority, application Japan, Sep. 5, 1983, 58-162766

Int. Cl.[4] C09K *3/34, 19/20;* G02F *1/13;* C07C *69/96, 68/02*

U.S. Cl. 252—299.65 7 Claims

1. A carbonic acid ester expressed by the formula



wherein R represents a linear chain or branched alkyl group of 1 to 18 carbon atoms; X represents COO, —O— or —CH_2; and * represents optically active carbon.

2. A chiral smectic liquid crystalline composition comprising at least two components, one of which is a carbonic acid ester as set forth in claim 1 and another of which is a smectic C liquid crystal.

4,589,997

PROCESS FOR PREPARING COLLOIDAL SOLUTION OF ANTIMONY PENTOXIDE

Yoshitane Watanabe, Tokyo; Keitaro Suzuki, Narashino, and Masayuki Teranishi, Funabashi, all of Japan, assignors to Nissan Chemical Industries, Ltd., Tokyo, Japan

Filed Aug. 3, 1984, Ser. No. 637,408

Claims priority, application Japan, Aug. 16, 1983, 58-149358

Int. Cl.[4] B01J *13/00;* C08K *3/22;* C09K *21/02*

U.S. Cl. 252—313.1 21 Claims

1. A process for preparing an antimony pentoxide sol, which comprises dispersing sodium antimonate in water, reacting the sodium antimonate with a monovalent or divalent inorganic acid added in a stoichiometrical amount of 0.7 time to 5 times the amount of the sodium antimonate to form the sodium salt of said inorganic acid and an antimony pentoxide gel, separating and water washing said gel, dispersing said gel in water, and peptizing said gel dispersed in water by adding an organic base in an amount to provide a stoichiometrical amount of base / Sb_2O_5 of from 0.03 to 1.

4,589,998

METHOD FOR TREATING OIL-WATER EMULSIONS AND RECOVERING SURFACTANTS

James R. Bragg, Houston, and Walter W. Gale, Spring, both of Tex., assignors to Exxon Production Research Co., Houston, Tex.

Filed Sep. 6, 1983, Ser. No. 529,190

Int. Cl.[4] C10M *119/10;* C09K *3/00*

U.S. Cl. 252—330 42 Claims

1. A process for breaking an oil-water-surfactant emulsion comprising crude oil, brine and surfactant, said emulsion being produced from a reservoir having a known reservoir temperature and a known reservoir salinity and having as one component a microemulsion which exhibits non-classical phase behavior, the process which comprises:

(a) bringing the temperature of the produced emulsion to be within an operable range of about 75° F. below to about 75° F. above said known reservoir temperature, and bringing the salinity of said produced emulsion to be within an operable range of about 70% to about 130% of said known reservoir salinity;

(b) adjusting said temperature within said operable temperature range or adjusting said salinity within said operable salinity range such that a critical salinity value and a critical temperature value is reached so that most of the surfactant becomes distributed in at least one aqueous phase;

(c) allowing the crude oil to coalesce into a separate oil phase; and

(d) separating said oil phase from said aqueous phase.

4,589,999

ELECTRICALLY CONDUCTIVE COATING COMPOSITION OF A GLYCIDYL ACRYLIC POLYMER AND A REACTIVE POLYSILOXANE

Joseph A. Vasta, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Dec. 28, 1984, Ser. No. 687,361

The portion of the term of this patent subsequent to May 1, 2001, has been disclaimed.

Int. Cl.[4] H01B *1/24*

U.S. Cl. 252—511 10 Claims

1. A coating composition comprising about 10–80% by weight of a film forming binder and 20–90% by weight of a liquid carrier, wherein the binder consists essentially of a blend of about

a. 20–90% by weight, based on the weight of the binder, of an acrylic polymer consisting essentially of about 10–50% by weight, based on the weight of the acrylic polymer, of polymerized glycidyl methacrylate or glycidyl acrylate and 50–90% by weight of polymerized ethylenically unsaturated monomers selected from the group consisting of an alkyl methacrylate having 1–12 carbon atoms, an alkyl acrylate having 1–12 carbon atoms, styrene, alkyl substituted styrenes and mixtures thereof, wherein the acrylic polymer has a weight average molecular weight of about 10,000–100,000, and

b. 10–80% by weight, based on the weight of the binder, of a crosslinkable polysiloxane having the following units:

where R and R^1 are individually selected from the group consisting of alkyl group having 1–6 carbon atoms, hydroxyl groups and phenyl group and contains a sufficient number of hydroxyl groups to provide a silanol content of about 0.5–7% by weight;

wherein the coating composition contains electrically conductive pigments in a pigment to binder weight ratio of about 50/100 to 300/100 and a dry film of the coating composition 25 microns thick has an electrical resistance of about 1–50 ohms.

4,590,000

METHOD AND APPARATUS FOR THE PACKAGING OF RADIOACTIVE WASTES

Henning Baatz; Dieter Rittscher, and Hans-Joachim Lür, all of Essen, Fed. Rep. of Germany, assignors to GNS Gesellschaft fur Nuklear-Service mbH, Essen, Fed. Rep. of Germany

Filed Apr. 8, 1983, Ser. No. 483,244

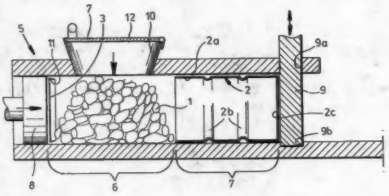
Claims priority, application Fed. Rep. of Germany, Apr. 10, 1982, 3213497

Int. Cl.[4] G21F *9/36*

U.S. Cl. 252—633 5 Claims

1. An apparatus for forming a radioactive waste package comprising a horizontal hydraulic press having a substantially horizontal pressing chamber, a ram hydraulically displaceable through said chamber from one end of said press toward an opposite end thereof, a retractable wall at said opposite end forming an anvil, an inlet for radioactive waste opening from above into said chamber at a location spaced from said wall by a distance sufficient to accommodate a collapsible steel container in which waste introduced into said chamber upstream

of said container can be compressed, said ram being displaceable to drive said waste into said container, to crush said container and to compress said waste within said container and the container itself against said wall by crushing the container, and to displace the crushed and compressed container and the



compressed waste contained therein out of said chamber upon retraction of said wall, and a cover disposed between said opening and said ram in said chamber when said ram is positioned toward the end of said chamber opposite the end holding said container, whereby the driving by said ram of said waste into said container applies said cover to said container.

4,590,001

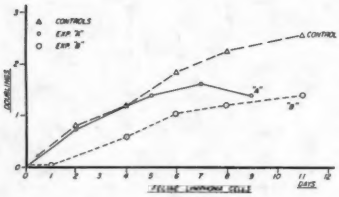
PLATINUM BOUND TO TRANSFERRIN FOR USE IN THE TREATMENT OF BREAST TUMORS

Rune L. Stjernholm, c/o Department of Biochemistry, Tulane Medical School, 1430 Tulane Ave., New Orleans, La. 70112

Continuation-in-part of Ser. No. 479,173, Mar. 28, 1983, abandoned. This application Mar. 27, 1984, Ser. No. 593,725

Int. Cl.⁴ C07K *15/06;* **A61K** *37/02, 35/14, 33/24*

U.S. Cl. 530—394 **2 Claims**



1. Monomeric platinum transferrin prepared by reacting cis-diamminedichloroplatinum II with essentially iron free human transferrin in the presence of cystine at 0°–5° C., then separating monomeric platinum transferrin from polymeric platinum transferrin.

4,590,002

METHODS FOR PREPARATION OF HIGHLY PURIFIED, GAMMA GLOBULINS FREE OF HEPATITIS-B-VIRUS INFECTIVITY

Raymond P. Zolton, Somerville; Paul M. Kaplan, Sergeantsville, and John V. Padvelskis, S. Somerville, all of N.J., assignors to Ortho Diagnostic Systems, Inc., Raritan, N.J.

Continuation-in-part of Ser. No. 680,191, Dec. 10, 1984, abandoned. This application May 17, 1985, Ser. No. 735,013

Int. Cl.⁴ A61K *39/12, 39/42, 37/06;* **C07K** *3/20*

U.S. Cl. 530—386 **13 Claims**

1. A method for removing hepatitis B infectivity from a gamma globulin containing body fluid comprising the steps of:

(a) providing the gamma globulin containing body fluid desired to be purified;

(b) applying the body fluid to first and second column means in series, said first column means containing an effective amount of a rigid resin consisting of DEAE-Sepharose CL-6B, DEAE-Sepharose CL-6B (Fast Flow) or DEAE Bio-Gel (High Capacity); and said second column means containing an effective amount of a non-rigid resin consisting of DEAE-Sephadex or QAE-Sephadex;

(c) eluting the body fluid from said first column means with a buffer adjusted to a pH of at least 7.0, said buffer consisting of approximately 0.02 M phosphate buffer if the resin selected for said second column means is QAE-Sephadex, or said buffer consisting of approximately 0.04 M Tris buffer, approximately 0.05 M Imidazole buffer, or approximately 0.035 sodium phosphate [Na_2HPO_4]-citric acid buffer, if the resin selected for said second column means is DEAE-Sephadex or QAE-Sephadex;

(d) monitoring the effluent from said first column means for the presence of protein;

(e) collecting, responsive to monitoring, the protein containing effluent;

(f) applying the collected protein containing effluent from said first column means to said second column means;

(g) eluting the fluid from said second column means with one of said buffers which may be utilized in said first column means, said buffer being adjusted to a pH of at least 7.0, the buffers used in the first and second column means respectively, being the same or diferent; and

(h) collecting the effluent from said second column means whereby any hepatitis-B-virus infectivity is now removed.

4,590,003

PLATELET RELATED GROWTH REGULATOR

Daniel R. Twardzik, Bainbridge Island, and George J. Todaro, Seattle, both of Wash., assignors to Oncogen, Seattle, Wash.

Filed Mar. 23, 1984, Ser. No. 592,969

Int. Cl.⁴ C07K *7/06, 7/08, 7/10;* **C12N** *5/00, 5/02*

U.S. Cl. 530—330 **5 Claims**

1. A composition being at least about 90% by weight of oncostatin-P, wherein said oncostatin-P is characterized by having a molecular weight of about 7000, being isolatable by extraction of platelets with approximately 0.3M ethanolic hydrochloric acid, precipitation with cold ethanol and ether and dialysis against 0.1–0.5M acetic acid and gel permeation chromatography employing Biogel P-10 and 1M acetic acid eluent, and having substantially the following sequence at its N-terminus: glu-ala-glu-glu-asp and capable of inhibiting tumor cell growth in the colony inhibition test.

4,590,004

PRISTINAMYCIN DERIVATIVES, THEIR PREPARATION AND THEIR USE

Jean-Pierre Corbet, Ecully; Claude Cotrel, Paris; Daniel Farge, Thiais, and Jean-Marc Paris, Vaires sur Marne, all of France, assignors to Rhone-Poulenc Sante, Courbevoie, France

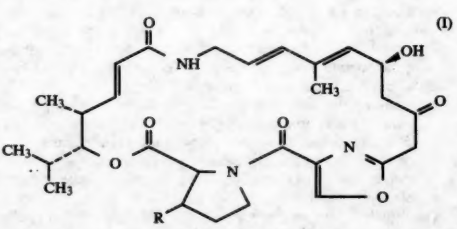
Filed Jul. 12, 1984, Ser. No. 630,284

Claims priority, application France, Jul. 13, 1983, 83 11707

Int. Cl.⁴ C07K *5/12*

U.S. Cl. 530—317 **5 Claims**

1. A pristinamycin II_B of the formula:



in which R represents an alkylthio radical substituted by (i) one or two alkylamino or dialkylamino radicals in which the alkyls

may be joined together to form, with the nitrogen atom to which they are bonded, a saturated heterocycle chosen from pyrrolidin-1-yl, piperidino, azetidin-1-yl, azepin-1-yl, morpholino, thiomorpholino and piperazin-1-yl, unsubstituted or substituted by an alkyl radical, or (ii) a pyrrolidin-2-yl or pyrrolidin-3-yl, piperidin-2-yl, piperidin-3-yl or piperidin-4-yl, azetidin-2-yl or azetidin-3-yl or azepin-2-yl, azepin-3-yl or azepin-4-yl radical; a radical of the formula:

Het—S—

in which Het represents a pyrrolidin-3-yl; piperidin-3-yl or piperidin-4-yl, azetidin-3-yl or azepin-3-yl or azepin-4-yl radical unsubstituted or N-substituted by alkyl; or a dialkylamino radical in which the alkyls may be joined together to form, with the nitrogen atom to which they are bonded, a saturated heterocycle chosen from pyrrolidin-1-yl, piperidino, azetidin-1-yl, azepin-1-yl, morpholino, thiomorpholino and piperazin-1-yl unsubstituted or substituted by an alkyl radical, the aforesaid alkyl radicals and alkyl portions of other radicals containing 1 to 5 carbon atoms each in a straight or branched chain, and its isomeric forms and mixtures thereof, and its pharmaceutically acceptable acid addition salts.

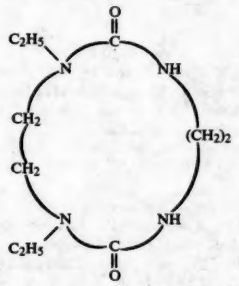
4,590,005

SOME MACROCYCLIC COMPOUNDS AND THEIR PREPARATION

Abraham Shanzer, 1 Hagedud Haivri Street, Bat Yam, and Eduard Schwartz, Histadrut 1074/2, Ashdod, both of Israel

Continuation of Ser. No. 262,508, May 11, 1981, abandoned, which is a continuation-in-part of Ser. No. 178,905, Aug 18, 1980, abandoned. This application Apr. 26, 1985, Ser. No. 726,946
Claims priority, application Israel, Aug. 22, 1979, 58084
Int. Cl.[4] C07D *257/02, 323/00, 341/00*
U.S. Cl. 260—239.3 R **6 Claims**

5. A compound of the formula



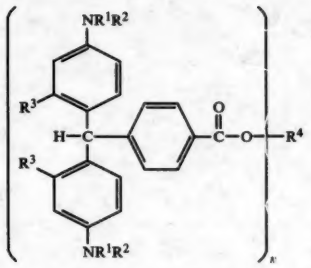
4,590,006

ORGANIC PHOTOCONDUCTORS HAVING IMPROVED PRE-EXPOSURE FATIGUE RESISTANCE AND BLOOMING PROPERTIES

Everett W. Bennett, Longmeadow, and Jan B. Suchy, Holyoke, both of Mass., assignors to James River Graphics, Inc., South Hadley, Mass.

Continuation-in-part of Ser. No. 320,068, Nov. 10, 1981, abandoned. This application Apr. 7, 1983, Ser. No. 482,843
Claims priority, application Canada, Nov. 9, 1982, 415158; PCT Int'l Appl., Nov. 10, 1982, PCT/US82/01596
Int. Cl.[4] C09B *11/10*
U.S. Cl. 260—393 **13 Claims**

1. A compound of the formula



(I)

wherein n is the integer 1 or 2; R^1 and R^2 are each an alkyl or aralkyl radical; R^3 is an alkyl radical; when n is 1, R^4 is an alkyl, aralkyl, alkenyl or aralkenyl radical, or an aryl radical having 6 carbon atoms in the aromatic nucleus, or a polyether radical containing up to 10 ether groups; and when n is 2, R^4 is a divalent linking radical selected from the group consisting of alkylene, aralkylene, alkenylene and aralkenylene radicals, arylene radicals having 6 carbon atoms in the aromatic nucleus and divalent polyether radicals containing up to 10 ether units.

4,590,007

FLURONAPHTHALENE CHROMIUM TRICARBONYLS USEFUL AS HYDROGENATION CATALYSTS FOR POLYUNSATURATED FATTY ACID RESIDUE-CONTAINING COMPOSITIONS

James R. Tucker, and Dennis P. Riley, both of Cincinnati, Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Filed Jul. 20, 1984, Ser. No. 632,775
Int. Cl.[4] C11C *3/12*
U.S. Cl. 260—409 **17 Claims**

1. A method for hydrogenating the polyunsaturated fatty acid residues of a polyunsaturated fatty acid residue-containing composition, which comprises the steps of:

(1) placing in a reactor having an inert inner surface a polyunsaturated fatty acid residue-containing composition comprising glycerides, non-glyceride esters, or mixture thereof, having nonconjugated polyunsaturated fatty acid residues; and

(2) contacting the polyunsaturated fatty acid residue-containing composition with hydrogen at a temperature of from about 100° to about 160° C. in the presence of a catalytic amount of, $[Cr(A)(CO)_3]$, wherein A is selected from the group consisting of alpha-fluoronaphthalene and beta-fluoronaphthalene, to hydrogenate the polyunsaturated fatty acid residues.

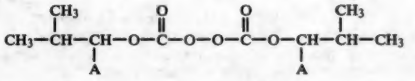
4,590,008

NOVEL ORGANIC PEROXYDICARBONATES

Robert H. Tang, Norton, and John C. Crano, Akron, both of Ohio, assignors to PPG Industries, Inc., Pittsburgh, Pa.

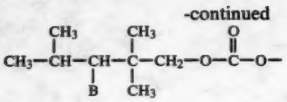
Filed Jun. 7, 1984, Ser. No. 618,273
Int. Cl.[4] C07C *69/003*
U.S. Cl. 558—264 **7 Claims**

1. Peroxydicarbonates represented by the graphic formulae:

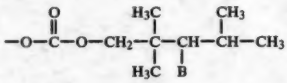


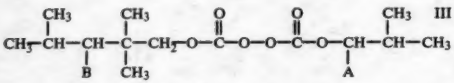
I

-continued



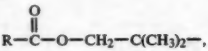
II



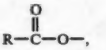


III

wherein A is the radical



B is the radical



and R is a C_1–C_7 alkyl radical.

4,590,009

STABILIZED POLYISOCYANATES PARTIALLY BLOCKED WITH HYDROXY AMINES

Georg Pampouchidis, Graz, and Herbert Deu, Kalsdorf, both of Austria, assignors to Vianova Kunstharz, A.G., Werndorf, Austria

Continuation of Ser. No. 161,499, Jun. 20, 1980, abandoned. This application Apr. 29, 1985, Ser. No. 728,699
Claims priority, application Austria, Jun. 22, 1979, 4394/79
Int. Cl.[4] C07C *118/00, 67/62, 69/00*
U.S. Cl. 560—332 **6 Claims**

1. The methodof reducing side reactions during the preparation and during storage of a compound having one free isocyanate group and obtained by reacting a member of the group consisting of aromatic, aliphatic, and cycloaliphatic polyisocyanates and mixtures thereof, and an amine of the general formula

wherein R is an alkanol or hydroxyphenyl radical, and R_1 and R_2 are alkyl, aryl or cycloalkyl radicals by the addition of from about 50 to 5000 ppm of hydrazine hydrate based on the said reacting amine.

4,590,010

SUBSTITUTED NAPHTHOIC ACID PROCESS

Venkataraman Ramachandran; Robert I. Davidson, and John R. Maloney, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed Apr. 18, 1985, Ser. No. 724,474
Int. Cl.[4] C07C *121/75, 63/36*
U.S. Cl. 558—341 **30 Claims**

1. A process which comprises (1) cyanating a 6-alkoxytetralone so as to form a 6-alkoxy-1-cyano-3,4-dihydronaphthalene, (2) converting the 6-alkoxy-1-cyano-3,4-dihydronaphthalene to a naphthoic acid precursor selected from a 6-alkoxy-1-cyanonaphthalene and a hydrocarbyl 6-alkoxy-1-naphthoate, (3) halogenating the naphthoic acid precursor to the corresponding 5-halo derivative, (4) trifluoromethylating the 5-halo derivative to replace the 5-halo substituent with a 5-trifluoromethyl group, and (5) hydrolyzing the resultant product to a 6-alkoxy-5-trifluoromethyl-1-naphthoic acid.

18. A 6-alkoxy-5-halo-1-cyanonaphthalene.

4,590,011

AMMOXIDATION PROCESS

Tao P. Li, Chesterfield, Mo., assignor to Monsanto Company, St. Louis, Mo.

Continuation of Ser. No. 554,502, Nov. 23, 1983, abandoned. This application Jun. 6, 1985, Ser. No. 742,000
Int. Cl.[4] C07C *120/14*
U.S. Cl. 558—323 **2 Claims**

1. A process for the ammoxidation of propylene to acyrlonitirle comprising charging to a fluidized bed reaction zone a feed comprising propylene, ammonia, and oxygen and recovering from said reaction zone acrylonitrile as a product of the process, and wherein the reaction zone contains a fluidized bed of ammoxidation catalyst supported on SiO_2 and consisting essentially of the following formula

$$Sb_aU_bFe_cBi_dMo_eMe_fO_g$$

wherein Me is Ni or Co, a is 1-10, b is 0.1 to 5, c is 0.1 to 5, d is 0.001 to 0.1, e is 0.001 to 0.1, f is 0 to 0.1, and g is a number taken to satisfy the valences of the quantities of Sb, U, Fe, Bi, and Mo, including Ni and Co, if present, and being physically mixed with an inert particulate material having a particle size distribution compatible with fluidization, said inert particulate material composing 2to 50% by weight of the said bed and comprising alpha alumina with a surface area of less than $5m^2/g$, a packing density of 0.9 to 1.4 g/ml and an average particle size less than about 150 microns.

4,590,012

PROCESS FOR PREPARING ALPHA-ARYLACRYLONITRILES

Venkataraman Ramachandran, Baton Rouge, La., assignor to Ethyl Corporation, Richmond, Va.

Filed May 17, 1985, Ser. No. 735,148
Int. Cl.[4] C07C *121/75, 121/62, 121/70*
U.S. Cl. 58—332 **18 Claims**

17. A process which comprises reacting a tetralone having a removable hydrogen alpha to the carbonyl group with an alkali metal cyanide and boron trifluoride in the presence of a catalytic amount of a tetraalkylammonium halide at a temperature of about 60°–120° C. so as to form a 1-cyano-3,4-dihydronaphthalene.

4,590,013

PROCESS FOR PREPARING ALPHA ARYLACRYLONITRILES

John R. Maloney, and Venkataraman Ramachandran, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.

Filed May 17, 1985, Ser. No. 735,151
Int. Cl.[4] C07C *121/75, 121/62, 121/70*
U.S. Cl. 558—332 **20 Claims**

19. A process which comprises reacting a tetralone having a removable hydrogen alpha to the carbonyl group with hydrogen cyanide and aluminum chloride at a temperature of about 60°–120° C. so as to form a 1-cyano-3,4-dihydronaphthalene.

4,590,014
SYNTHESIS OF ALKYL PHOSPHINATE SALTS

Stephen F. Wolf, St. Paul, and Chung-Tsing Liu, Bloomington, both of Minn., assignors to Economics Laboratory, Inc., St. Paul, Minn.

Filed Sep. 6, 1984, Ser. No. 647,918
Int. Cl.[4] C07F 9/38; C07C 69/34
U.S. Cl. 260—502.4 R 10 Claims

1. A method for the preparation of alkyl phosphinate salts by the reaction of an olefinic material with an alkali metal hypophosphite in the presence of an organic peroxyester free radical source comprising:

(a) simultaneously adding an alcoholic solution of the olefinic material and an alcoholic solution containing essentially all of the free radical source or a mixture thereof to a reaction medium comprising an aqueous alcoholic solution of the hypophosphite, while maintaining the hypophosphite solution at about 50°–100° C. during the addition; and

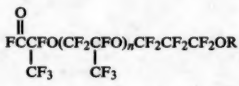
(b) heating the combined solutions at 50°–100° C. for about 1.5–6.0 hours to afford about an 80–100% yield of the alkyl phosphinate salt.

4,590,015
FLUORINATED POLYETHER CARBOXYLIC ACID FLUORIDES

Paul R. Resnick, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 565,778, Dec. 27, 1983, Pat. No. 4,526,948. This application Mar. 1, 1985, Ser. No. 707,208
Int. Cl.[4] C07C 53/50
U.S. Cl. 260—544 F 3 Claims

1. A chemical compound having the structural formula



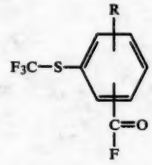
wherein n is 0 or 1 and R is CH_3 or C_2H_5.

4,590,016
PREPARATION OF FLUOROMETHYLTHIOBENZOYL FLUORIDES

Juergen Varwig, Heidelberg, and Gerhard Hamprecht, Weinheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Division of Ser. No. 398,424, Jul. 14, 1982, abandoned. This application Mar. 14, 1984, Ser. No. 589,305
Claims priority, application Fed. Rep. of Germany, Aug. 1, 1981, 3130436
Int. Cl.[4] C07C 51/58
U.S. Cl. 260—544 F 6 Claims

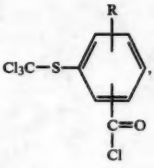
1. A process for the production of a meta- or para-trifluoromethylthiobenzoyl fluoride of the formula



Ia

wherein R is hydrogen, bromine, chlorine or alkyl of 1 to 4 carbon atoms, which process comprises:

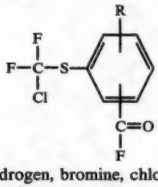
reacting a trichloromethylthiobenzoyl chloride of the formula



II

wherein R has the above meanings, with from 1.2 to 100 moles of hydrogen fluoride per mole of II, at a temperature of from 40° to 130° C. and under a pressure of from 2 to 30 bar.

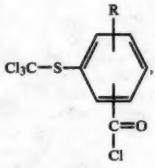
2. A process for the production of a meta- or para-difluoromonochloromethylthiobenzoyl fluoride of the formula



Ib

wherein R is hydrogen, bromine, chlorine or alkyl of 1 to 4 carbon atoms, which process comprises:

reacting a trichloromethylthiobenzoyl chloride of the formula



II

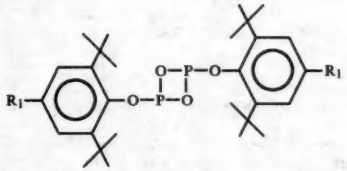
wherein R has the above meanings, with from 1.2 to 100 moles of hydrogen fluoride per mole of II, at a temperature of from 10° to 40° C. and under a pressure of from 1 to 10 bar.

4,590,017
2,4-BIS-(2,6-DI-T-ALKYL-4-SUBSTITUTED-PHENOXY)-1,3,2,4-DIOXADIPHOSPHETANES

Dwight W. Chasar, Northfield, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Feb. 19, 1985, Ser. No. 703,063
Int. Cl.[4] C07F 9/146
U.S. Cl. 558—73 9 Claims

1. 2,4-bis(2,6-di-t-alkyl-4-substituted-phenoxy)-1,3,2,4-dioxadiphosphetanes having the structure



wherein + is t-butyl or t-pentyl and R_1 is hydrogen, primary, secondary, and tertiary alkyl radicals containing 1 to 9 carbon

atoms such as methyl, ethyl, isopropyl, n-butyl, t-butyl, amyl, t-amyl, hexyl, heptyl, 2-methyl hexyl, 2-ethyl hexyl, octyl, isooctyl, and the like; cycloalkyl radicals containing 3 to 6 carbon atoms; halogen; C≡N; alkoxy radicals containing 1 to 8 carbon atoms, such as methoxy, ethoxy, butoxy and the like; phenyl; $COOR_2$ wherein R_2 is an alkyl radical containing 1 to 8 carbon atoms; $—CH_2CH_2COOR_3$ wherein R_3 is is an alkyl radical containing 1 to 18 carbon atoms, and $—C(CH_3)_2CON(R_4)_2$ wherein R_4 is an alkyl group of 1 to 9 carbon atoms.

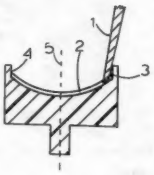
4,590,018
METHOD OF IMPROVING SPIN CAST LENSES

Charles W. Neefe, Box 361, Big Spring, Tex. 79721

Continuation-in-part of Ser. No. 525,225, Aug. 22, 1983, abandoned, which is a continuation-in-part of Ser. No. 506,873, Jul. 5, 1983, abandoned, which is a continuation-in-part of Ser. No. 417,641, Sep. 13, 1982, Pat. No. 4,416,837. This application Feb. 12, 1985, Ser. No. 701,029

Int. Cl.[4] B29D *11/00*

U.S. Cl. 264—2.1 **1 Claim**



1. A method of improving the edge shape of spin cast lenses by the steps of providing a concave spin casting mold having a circular raised rim surrounding the concave optical mold surface, placing a liquid lens monomer in the spin casting mold, rotating the spin casting mold around its axis of rotation, a solid wiper which is also the injection nozzle tube through which the liquid lens monomer is metered and introduced into the concave spin casting mold is placed in contact with the rotating liquid monomer near the circular raised rim surrounding the concave optical mold surface, allowing the rotating liquid lens monomer to be displaced by the stationary solid wiper and the liquid monomer to move outward against the circular raised rim surrounding the concave optical mold surface, removing the solid wiper from the rotating liquid and allowing the rotating liquid lens monomer to form a smooth surface in contact with the raised rim surrounding the rotating concave optical mold surface, allowing the rotating liquid lens monomer to polymerize to form a solid lens having an improved edge shape.

4,590,019
PROCESSES FOR THE PRODUCTION OF FREE-FLOWING NITROCELLULOSE

Erhard Lühmann, Bomlitz; Lutz Hoppe, and Klaus Szablikowski, both of Walsrode, all of Fed. Rep. of Germany, assignors to Wolff Walsrode Aktiengesellschaft, Walsrode, Fed. Rep. of Germany

Filed Sep. 5, 1984, Ser. No. 647,340

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1983, 3334823

Int. Cl.[4] C06B *21/00*

U.S. Cl. 264—3.4 **6 Claims**

1. A process for the production of free-flowing, non-fibrous, alcohol-moistened nitrocellulose (NC), wherein a water- or alcohol-moist nitrocellulose is softened with a solvent mixture of a nitrocellulose solvent and a lower aliphatic alcohol and water until the nitrocellulose fibers disappear, the alcohol-containing, liquid phase is decanted off from the resulting two-phase mixture and the nitrocellulose-containing phase is processed into a granulate using a screw extruder, the quantity of solvent mixture used being from 75 to 155% by weight, based on dry nitrocellulose, and the components of the mixture, NC-solvent:lower alcohol:water, being present in a weight ratio of 1:(0.2–4):(0.2–4).

4,590,020
METHOD OF PRODUCING ORIENTED POLYETHYLENE FILM

Yasushi Itaba, Tokyo; Keichiro Saito; Jyoichi Tabuchi, both of Saitama, and Masao Yoshizawa, Tokyo, all of Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 22, 1984, Ser. No. 592,321

Claims priority, application Japan, Mar. 23, 1983, 58-47107; Mar. 23, 1983, 58-47108

Int. Cl.[4] B29C *35/02, 35/10, 55/02*

U.S. Cl. 264—22 **11 Claims**

1. A method for producing high clarity oriented polyethylene film which comprises

(a) crosslinking opposite surfaces of a sheet of polyethylene selected from HDPE and blends of HDPE and a small quantity of at least one other polyolefin, said polyethylene having a density greater than 0.940 g/cm^3, in such a manner that the degree of crosslinking decreases from said surfaces inwardly to produce a sheet wherein opposite outer layer portions of the sheet each has gel fractions of between 20 to 70% and the middle layer portion of the sheet has gel fractions between 0 to 5%, said outer and middle layer portions having substantially the same polyethylene composition; and

(b) heating and stretching the crosslinked sheet under conditions to orient the polyethylene molecules thereby producing an oriented film having a thickness between 10 and 50 microns.

4,590,021
METHOD FOR PRODUCING POLYESTER CONTAINERS

Akiho Ota, Funabashi, and Fumio Negishi, Katsushika, both of Japan, assignors to Yoshino Kogyosho Co., Ltd., Tokyo, Japan

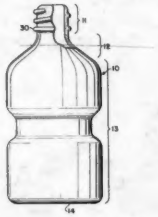
Continuation-in-part of Ser. No. 428,639, Sep. 30, 1982, abandoned, which is a continuation of Ser. No. 317,887, Nov. 3, 1981, Pat. No. 4,379,099, which is a continuation of Ser. No. 150,662, May 16, 1980, abandoned, which is a division of Ser. No. 19,913, Mar. 12, 1979, abandoned. This application Jan. 11, 1984, Ser. No. 570,030

Claims priority, application Japan, Jun. 29, 1978, 53-89840; Jul. 4, 1978, 53-81340; Oct. 4, 1978, 53-124303

The portion of the term of this patent subsequent to Apr. 5, 2000, has been disclaimed.

Int. Cl.[4] B29C *49/64, 49/08*

U.S. Cl. 264—25 **13 Claims**



1. A method for producing a hollow bottle-shaped container of biaxially oriented polyethylene terephthalate having a non-biaxially oriented neck section, a bottom section, and a biaxially oriented body section extending between said neck section

and bottom section from a preform having a prefinished neck section, said method comprising the steps of:

heating only the prefinished neck section of said preform to a heating temperature of at least the glass transition temperature of the preform for a heating time at least long enough to begin formation of crystal nuclei, and thereafter cooling the neck section to increase the density of the spherulitic texture only in the neck section to produce a preform having a crystallized area only in the neck section and the remainder of the preform being uncrystallized, and thereafter

biaxially orienting in a mold only the regions of the preform below said neck section, including those immediately therebelow, to form the hollow bottle-shaped container with a crystallized area only in the neck section.

4,590,022

METHOD OF FORMING A MOISTURE PERMEABLE POLYMERIC SHEET MATERIAL

Gheorge Cioca, Coatesville; George F. Feeley, Downingtown, both of Pa.; Joseph B. Brabson, Wilmington, Del., and Peter Barth, Neuwied, Fed. Rep. of Germany, assignors to Seton Company, Newark, N.J.

Division of Ser. No. 521,147, Aug. 8, 1983, Pat. No. 4,497,862, Division of Ser. No. 314,536, Oct. 26, 1981, Pat. No. 4,415,628. This application Oct. 19, 1984, Ser. No. 662,507

Int. Cl.[4] C08J *9/28, 9/26, 9/42;* **B29C** *39/20*

U.S. Cl. 264—41 **27 Claims**

1. A method of forming a moisture vapor permeable sheet material comprising:

A. forming a homogeneous fluid admixture of a protein derivative and a synthetic organic polymer in a solvent wherein the protein derivative is present in an amount between 1 and 15 percent by weight of the combined weight of the protein derivative and the synthetic organic polymer and has a pH level compatible with the pH level of the organic polymer;

B. forming a film from the homogeneous admixture; and

C. removing the solvent from said solution to form a sheet material which is a solid solution of the protein derivative and the organic polymer, said sheet material being moisture vapor permeable and nonpenetrable by liquid water.

4,590,023

METHOD FOR MANUFACTURING AN INJECTION-MOLDED FOAM CORE SKI PLATE

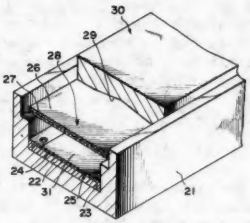
Keijiro Hayashi, Takatsuki; Toshimi Awano, Ohgaki, and Shigeru Asai, Gifu, all of Japan, assignors to Mizuno Corporation, Osaka, Japan

Filed May 14, 1984, Ser. No. 609,670

Claims priority, application Japan, Jul. 19, 1983, 58-132228

Int. Cl.[4] B29C *67/22, 45/14*

U.S. Cl. 264—46.5 **3 Claims**



1. A method of manufacturing an injection-molded ski plate, said method comprising:

positioning a lower side constituting member and an upper side constituting thermoplastic resin member in a lower mold in a spaced apart relationship to define a hollow space between said lower side constituting member and said upper side constituting member;

disposing on the upper side constituting member an upper mold formed with a concaved portion having a desired roof-like shape; and

injecting a foamable thermosetting synthetic resin into said hollow space, the expansion and reaction heat of said resin resulting in deformation of said upper side constituting member to follow said concaved portion of said upper mold so that a convex roof-like portion is integrally formed on said upper side constituting member with the expansion of said resin.

4,590,024

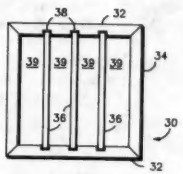
SILICON DEPOSITION PROCESS

Israel A. Lesk, Phoenix; M. John Rice, Jr., Tempe, and Kalluri R. Sarma, Mesa, all of Ariz., assignors to Solavolt International, Houston, Tex.

Filed Mar. 29, 1984, Ser. No. 594,456

Int. Cl.[4] B29C *13/00*

U.S. Cl. 264—81 **10 Claims**



1. A process for the fabrication of silicon sheets which comprises the steps of: providing a deposition reactor vessel having walls, said walls having interior surfaces bounding a reaction volume; providing a plurality of partitions within said reaction volume integral with and demountable from said interior surfaces; introducing silicon bearing reactants to said reaction volume; heating said reaction volume to deposit silicon from said silicon bearing reactants onto said interior surfaces and said partitions; and separating said deposited silicon in the form of sheets from said interior surfaces and said partitions.

4,590,025

IMPREGNATION OF THREAD-COVERED WIRES AND BRAIDED CONDUCTORS BY EXTRUSION OF THERMOPLASTICS

Udo Reiter, Mutterstadt, and Helmut Lehmann, Reinbek, both of Fed. Rep. of Germany, assignors to Dr. Beck & Co. Aktiengesellschaft, Hamburg, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 504,038, Jun. 30, 1983, abandoned. This application Apr. 16, 1985, Ser. No. 722,770

Claims priority, application Fed. Rep. of Germany, Nov. 19, 1981, 3145918

Int. Cl.[4] B29F *3/10*

U.S. Cl. 264—103 **6 Claims**

1. A process for impregnating a covered wire comprising:

(a) extrusion coating bare wires with a thermoplastic resin;

(b) covering the coated wire of (a) with a continuous glass fiber to form said covered wire;

(c) preheating said covered wire of (b);

(d) introducing solvent-free thermoplastic polycondensates into an apparatus comprising a screw extruder and an extrusion head connected at the downstream end of said screw extruder, said extrusion head comprising at least one extrusion unit formed of a die holder with a gauging die and a guiding die coaxially held therein, said gauging die having a cylindrical bore portion at its downstream end; a frustoconical bore joining said cylindrical bore portion at the upstream side thereof; and a frustoconical entry portion of an aperture angle greater than said frusto-

conical bore, joining said frustoconical bore at the upstream end thereof, said guiding die having a central passageway matching said covered wire in diameter and a downstream face of frustoconical shape facing said entry portion, said downstream face and said entry portion determining therebetween an annular distribution chamber of frustoconical shape arranged in such a manner that said thermoplastic polycondensates gradually accelerate therein and said die holder containing holes therethrough for feeding the annular base of said distribution chamber with said thermoplastic polycondensates from said extruder;

(e) heating said thermoplastic polycondensates to a molten form in said apparatus;

(f) extruding said covered wires through said apparatus and impregnating said covered wire in a single operation;

(g) passing said impregnated wire through said gauging die;

(h) cooling said gauging died wire; and

(i) winding said cooled wire onto a reel.

4,590,026

PROCESS FOR MAKING REINFORCING LAYERS ON INNER SURFACES OF COMPLICATED CAVITIES

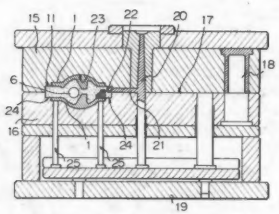
Fumio Goto, Kurashiki, Japan, assignor to Namba Press Works Co. Ltd., Japan

Filed Jun. 18, 1984, Ser. No. 621,696

Claims priority, application Japan, Jun. 20, 1983, 58-109412

Int. Cl.⁴ B29C *33/52*

U.S. Cl. 264—221 **10 Claims**



1. Process for reinforcing inner surfaces of complicated and inaccessible cavities of a unitary molded plastic article with metallic or ceramic material, comprising the steps of:

(a) making a core member having outer surfaces of complicated and irregular configurations complementary to said complicated and inaccessible cavities of the molded plastic article to be obtained from water-soluble or heat-meltable inert material, said core member being of a length between its end surfaces greater than the length of a mold cavity to be used,

(b) applying metallic or ceramic reinforcing material onto said complicated and irregular outer surfaces of said core member except said end surfaces at temperature above the degradation temperature of the plastic material subsequently used to form said molded plastic article to form a reinforcing layer of sufficient thickness to impart desired mechanical strength and resistance to abrasion and chemicals to the molded plastic article,

(c) placing said core member covered with said reinforcing layer into a mold cavity formed by two mold halves for injection or transfer molding in such a manner that a continuous spacing necessary to form the molded plastic article is left between said reinforcing layer and the inner surface of said mold cavity, and securing end portions of said core member extending beyond said mold cavity between said mold halves by closing the same,

(d) injecting molten plastic material into said continuous spacing to form a unitary plastic body around and integrally with said reinforcing layer, and

(e) removing said plastic body containing therein said reinforcing layer and said core member from said mold cavity, and then applying water or heat to said core member thereby to fluidize and remove said inert material from said plastic body to leave said reinforcing layer therein integral with said plastic body, thus producing the unitary molded plastic article having on its complicated and inaccessible cavity surfaces the reinforcing metallic or ceramic layer.

4,590,027

METHOD OF PRODUCING A THERMOPLASTICS MATERIAL

David J. Murphy, 17, Guildford Road West, and Leslie N. Phillips, 22, Carlyon Close, both of Farnborough, Hampshire, England

Continuation of Ser. No. 297,331, Aug. 28, 1981, abandoned, which is a continuation of Ser. No. 44,115, May 3, 1979, which is a continuation of Ser. No. 803,938, Jun. 6, 1977. This application May 17, 1984, Ser. No. 611,380

Claims priority, application United Kingdom, Jun. 10, 1976, 24167/76; Oct. 22, 1976, 44068/76

Int. Cl.⁴ B29C *43/20*

U.S. Cl. 264—135 **17 Claims**

1. A method of producing a substantially void-free and substantially stiff laminated structural material which material includes thermoplastics matrix material and a fibrous reinforcement material in the form of a woven fabric, a non-woven fabric, a felt or a paper, said method consisting essentially of the successive steps of:

(a) impregnating said fibrous material throughout with a first thermoplastics material which is soluble in a solvent and is applied in a solvent solution, the solvent of said solution being allowed to evaporate after impregnation, the amount of the first thermoplastics material with which the said fibrous material is impregnated being at least sufficient for thorough impregnation of the fibers, but insufficient for the matrix of the desired structural material;

(b) stacking at least two layers of thus impregnated fibrous material, in alternate sequence with interleaving layers of a second thermoplastic material in sheet form, the amount of the second thermoplastics material included in the stack being such that the total amount of thermoplastics matrix material present in the stack is sufficient to enable the desired substantially stiff laminated structural material to be produced;

(c) subjecting the thus formed stack to heat and pressure in a preheated mould or press for sufficient time, in excess of 10 minutes, to cause the first and second thermoplastics material to soften and flow and to cause said thermoplastics materials to bond together and to bond to the fibrous material in a substantially void-free manner and to cause the stack to conform to a desired intermediate stock form or final product form, whereby a substantially stiff laminated structural material is produced having a flexural strength of at least 250 MPA; and thereafter

(d) allowing the mould or press to cool sufficiently to avoid distortion of the laminated structural material thus produced before removal of said laminated structural material from the mould or press.

4,590,028

PROCESS FOR MAKING A MULTILAYERED PARISON OF THERMOPLASTIC MATERIAL

Otto Rosenkranz; Claus Horwege, and Norbert Höne, all of Hamburg, Fed. Rep. of Germany, assignors to Krupp Corpoplast Maschinenbau GmbH, Fed. Rep. of Germany

Filed Feb. 21, 1985, Ser. No. 703,862

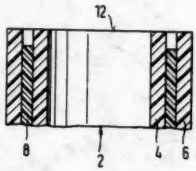
Claims priority, application Fed. Rep. of Germany, Feb. 27, 1984, 3407060

Int. Cl.⁴ B29C *49/04, 49/22*

U.S. Cl. 264—154 **6 Claims**

1. A method for making a parison having three or more layers for blowmolding a biaxially oriented hollow article of

thermoplastic material, in particular a bottle, in which an end portion of an extruded tubular body is heated to welding temperature and is closed to a bottom by a forming step, characterized by removing the medium layer or, respectively medium layers from the portion adjacent the end face of the end portion to be closed and subsequently heat forming the end portion.



4,590,029

MOLECULARLY ORIENTATING PLASTICS MATERIAL

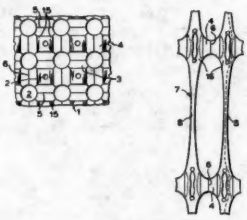
Frank B. Mercer, Blackburn, England, assignor to P. L. G. Research Limited, Blackburn, England

Filed Oct. 3, 1983, Ser. No. 538,420

Claims priority, application United Kingdom, Oct. 13, 1982, 8229205

Int. Cl.⁴ B29C *55/12*

U.S. Cl. 264—156 **22 Claims**



1. A method of producing a plastics material mesh structure, comprising:

providing a plastics material comprising a pattern of holes or mesh openings defining strand-forming zones therebetween, which plastics material mesh structure has a melting range having a lower limit, and forming depressions in at least some of said strand-forming zones without material removal when said plastics material is at a temperature below said lower limit; and

stretching said strand-forming zones to form orientated strands.

4,590,030

PROCESS AND APPARATUS FOR PRODUCING AN OPTICALLY UNIFORM, TRANSPARENT COATING, LAYER, FILM OR SHEET FROM A MIXTURE OF COMPONENTS

Manfred Gillner, Aachen; Hans G. Friedrich, Wuerselen; Christian Grau; Richard Crumbach, both of Aachen; Heinz Scholl, Eischweiler, and Christian Hiemenz, Herzogenrath, all of Fed. Rep. of Germany, assignors to Saint-Gobain Vitrage, Aubervilliers, France

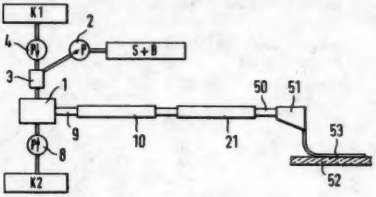
Filed Jun. 6, 1984, Ser. No. 617,814

Claims priority, application France, Jun. 14, 1983, 83 09839

Int. Cl.⁴ B29C *41/12*; F16D *27/01*

U.S. Cl. 264—331.19 **12 Claims**

1. A process for producing a homogeneous and highly transparent sheet or film from a mixture of a plurality of components, which comprises mixing the combined reaction components and depositing said mixture on a molding substrate where the reaction is carried out in a layer thereon, wherein the combined reaction components are mixed, first, in a static mixer and, immediately thereafter, in a dynamic mixer, and wherein the combined reaction components are passed for a distance through the static mixer sufficient to achieve only a premixing and without an increase in temperature, and immediately thereafter, the statically premixed reaction mixture is fed to a dynamic mixer, wherein sufficient mixing is effected to obtain the requirement degree homogeneity.



4,590,031

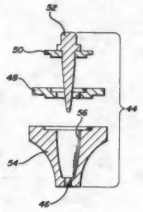
MOLDING TOOL AND METHOD

Erwin Eichen, West Bloomfield, and James D. Flasck, Rochester, both of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Continuation-in-part of Ser. No. 535,352, Sep. 23, 1983. This application Apr. 6, 1984, Ser. No. 597,438

Int. Cl.⁴ B29C *33/00, 41/42*

U.S. Cl. 264—338 **34 Claims**



17. A method of molding an article comprising:

(a) providing a mold having a working surface that defines a predetermined shape, said working surface having a coating for contact with material to be molded during molding, said coating formed by sputtering while maintaining said working surface at a temperature permitting the formation of disordered boron and carbon and consisting essentially of disordered boron and said carbon, said coating over at least a portion of said working surface;

(b) placing a moldable material in said mold and forming said moldable material into the desired shape; and

(c) thereafter releasing the moldable material from the mold.

4,590,032

PROCESS FOR DRAW-FRACTURABLE YARN

Bobby M. Phillips, Kingsport, Tenn., assignor to Eastman Kodak Company, Rochester, N.Y.

Division of Ser. No. 390,739, Jun. 21, 1982, Pat. No. 4,472,477. This application Jun. 25, 1984, Ser. No. 624,086

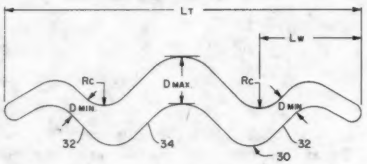
Int. Cl.⁴ D01D *5/42*

U.S. Cl. 264—555 **6 Claims**

1. Process for melt spinning a filament having a body section and at least one wing member, the process comprising

(a) melt spinning a filament-forming polymeric material through a spinneret orifice the planar cross-section of

which defines intersecting quadrilaterals in connected series with the L/W of each quadrilateral varying from 2 to 10 and with one or more of the defined quadrilaterals being greater in width than the width of the remaining quadrilaterals, with the wider quadrilaterals defining body sections and with the remaining quadrilaterals defining wing member to form a filament having a cross-section comprising said body section and said at least one wing member joined to said body section, said at least one wing



member varying up to about twice its minimum thickness along its width, at the junction of said body section and said at least one wing member the respective faired surfaces thereof define a radius of concave curvatrue (Rc) on one side of said cross-section and a generally convex curve located on the other side of said cross-section generally opposite said radius of curvature (Rc), said body section comprising about 5 to about 75%, said filament being further characterized by a wing-body interaction (WBI) defined by

$$WBI = \left[\frac{(Dmax - Dmin)Dmin}{2Rc^2}\right]\left[\frac{Lw}{Dmin}\right]^2 \geq 1$$

where the ratio of the width of said filament cross-section to the wing member thickness (L_T/Dmin) is <30, Dmax is the maximum thickness of the body section, Dmin is the thickness of the wing member of essentically uniform wing members and the minimum thickness close to the body section when the thickness of the wing member is variable, Rc is the radius of curvatrue of the intersection of the wing member and body section, Lw is the overall length of an individual wing member and Lt is the overall length of the fillament cross-section;

(b) quenching said filament at a rate sufficient to maintain at least a wing-body interaction (WBI) of the spun filament; and

(c) taking up said filament under tension.

4,590,033

MULTI-LOBE COMPOSITE CASING FOR A MULTI-SCREW PROCESSING MACHINE

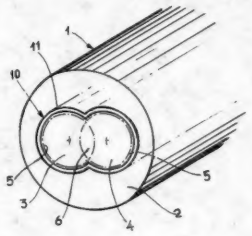
Marc Chapet, Unieux, France, assignor to CLEXTRAL, Paris, France

Filed Jan. 28, 1985, Ser. No. 695,153
Claims priority, application France, Jan. 26, 1984, 84 01182
Int. Cl.[4] B22F 7/00
U.S. Cl. 419—9 **4 Claims**

1. Process for the formation of a hard metallic layer on a metallic base wall of a multi-lobe composite casing, comprising the steps of

(a) providing said hard metallic layer in the form of a powder containing desired constituents;

(b) depositing said powder on an inner metallic base wall of said casing; and



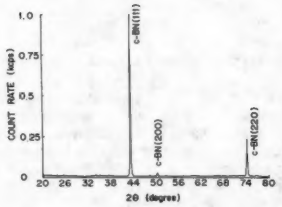
(c) welding said powder on said inner wall by means of a plasma torch operating on the transferred arc or semi-transferred arc principle.

4,590,034

METHOD FOR PREPARING SINTERED BODY CONTAINING CUBIC BORON NITRIDE AND METHOD FOR PREPARING CUBIC BORON NITRIDE

Shin-ichi Hirano, and Shigeharu Naka, both of Nagoya, Japan, assignors to Toshiba Tungaloy Co., Ltd., Kawasaki, Japan

Filed Mar. 21, 1985, Ser. No. 714,497
Claims priority, application Japan, Mar. 22, 1984, 59-54656
Int. Cl.[4] B22F 5/00
U.S. Cl. 419—13 **10 Claims**



1. A method for preparing a sintered body containing cubic boron nitride which comprises the steps of:

contacting (A) a starting material containing boron nitride and/or a starting material containing at least one selected from the group consisting of metals of groups IVb, Vb and VIb of the periodic table, silicon, aluminum, iron group metals, and compounds selected from the group consisting of carbides, nitrides and borides of the metals of said groups IVb, Vb, and VIb, AlN, AlB_{12}, Al_2O_3, SiC, and Si_3N_4 with (B) at least one selected from the group consisting of borazine, a borazine derivative and a compound comprised of boron, nitrogen and hydrogen which releases hydrogen by thermal decomposition under pressure to form boron nitride which is converted into cubic boron nitride at a predetermined pressure and temperature; and then

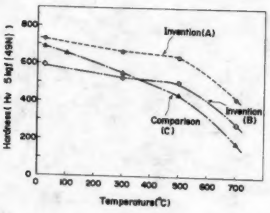
sintering the material under predetermined conditions of pressure and temperature at which cubic boron nitride is stable.

4,590,035

HIGH-HARDNESS HEAT-RESISTANT ALLOY

Jitsuhiko Ueda, Kobe; Yutaka Tomono, Ibaraki, and Kazuhiko Tanaka, Osaka, all of Japan, assignors to Hitachi Zosen Corporation, Osaka, Japan

Filed Feb. 5, 1985, Ser. No. 698,446
Int. Cl.[4] C22C *19/05*
U.S. Cl. 420—449 1 Claim



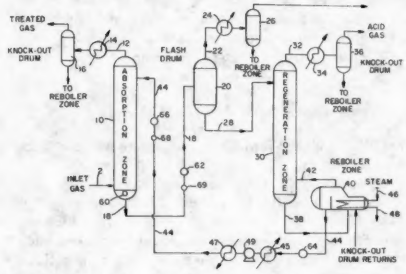
1. A high-hardness heat-resistant alloy consisting of 13–17 wt % of Cr, 2–6 wt % of Al, 0.1–8 wt % of Mo, 1.5–3.5 wt % of B, 0.5–3 wt % of Ti, and 4–7 wt % of Co, the remaining components of the alloy being Ni and inevitable impurities.

4,590,036

PROCESS FOR CORROSION INHIBITION UTILIZING AN ANTIMONY-MOLYBDENUM SALT CORROSION INHIBITOR COMPOSITION

Z. Andrew Foroulis, Mendham, N.J., assignor to Exxon Research and Engineering Co., Florham Park, N.J.

Division of Ser. No. 344,986, Feb. 2, 1982, Pat. No. 4,499,003. This application Oct. 3, 1984, Ser. No. 657,243
Int. Cl.[4] C23F *11/06*
U.S. Cl. 422—13 19 Claims



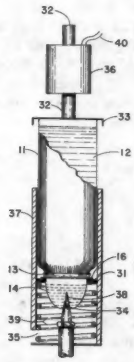
1. A process for preventing corrosion of metals in contact with an alkaline liquid-acid gas absorbing solution comprising the step of adding to said solution an effective amount of corrosion inhibiting composition comprising an aqueous solution of soluble salts of antimony and molybdenum wherein the weight ratio of antimony salt to molybdenum salt ranges between about 0.05 to 1 and about 0.2 to 1.

4,590,037

MEANS FOR CONSECUTIVE INTRODUCTION OF CO-ACTING STERILANTS INTO A STERILIZING CHAMBER

Saul Kaye, Evanston, Ill., assignor to Ben Venue Laboratories, Inc., Bedford, Ohio

Continuation-in-part of Ser. No. 492,709, May 9, 1983, which is a continuation-in-part of Ser. No. 212,973, Feb. 13, 1981, abandoned. This application Mar. 4, 1985, Ser. No. 707,578
Int. Cl.[4] A61L *2/20*
U.S. Cl. 422—116 4 Claims



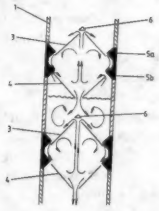
1. A unitary device having a plurality of chambers for the sequential addition of a plurality of co-reactive liquids to a sterilizing apparatus, a first liquid comprising water in a sealed first container, said first container being contiguous with a sealed second container having therewithin a second liquid comprising at least ethylene oxide, a holder for said containers, means for opening said containers sequentially, and means for maintaining a vaporization-time interval after opening said first container prior to opening said second container.

4,590,038

FLUIDIZING-CELL COLUMN

Georg Schreiber, Kiefernweg 7, 5000 Koln 7, and Heinrich Lob, Troisdorf-Eschmar, both of Fed. Rep. of Germany, assignors to Georg Schreiber, Cologne, Fed. Rep. of Germany

Filed Mar. 17, 1983, Ser. No. 476,434
Claims priority, application Fed. Rep. of Germany, Mar. 19, 1982, 3210117
Int. Cl.[4] B01D *11/00, 9/02;* B01J *8/20*
U.S. Cl. 422—142 8 Claims



1. In a vertical fluidizing-cell column having plates disposed substantially across the inside of the column, and means for supplying a treating fluid to the lower end of the column and supplying fluid material to be treated to the upper end of the column, the improved apparatus comprising:

at least three coned plates each having a central opening and

being disposed in the column with a peripheral opening thereabout, the plates having concave and convex sides alternately directed upwardly for defining in the column, between each pair of the plates having facing convex sides, a separating chamber and, between each pair of the plates having facing concave sides, a mixing chamber; and

means for causing the treating fluid to flow into each separating chamber through the central opening in the lower plate of each separating chamber and out through the peripheral opening of the upper plate of each separating chamber and the fluid material to be treated to flow into each separating chamber through the central opening of the upper plate of each separating chamber and out through the peripheral opening of the lower plate of each separating chamber, the means comprising a center piece covering the central opening in the lower plate of each separating chamber and defining an annular path for radial flow therebetween.

4,590,039

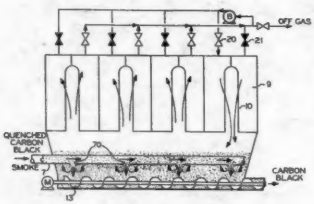
AUTO-PRESEPARATION OF CARBON BLACK

Paul J. Cheng, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 384,295, Jun. 2, 1982, Pat. No. 4,396,590, which is a continuation-in-part of Ser. No. 255,990, Apr. 20, 1981, abandoned. This application Sep. 20, 1982, Ser. No. 420,436

Int. Cl.[4] C09C *1/48*

U.S. Cl. 422—150 **3 Claims**



1. Apparatus for separating carbon black from carbon black containing smoke comprising

(a) a source of carbon black containing smoke, which source is a carbon black furnace,

(b) at least one collecting chamber for collecting loose, flocculent, dry carbon black, wherein said collecting chamber comprises downwardly converging walls, and wherein a mass of loose, flocculant, dry carbon black is accumulated at the bottom of said collecting chamber

(c) conveying means associated with the lowest section of said collecting chamber,

(d) a conduit connecting said source and said collecting chamber, said conduit extending into said collecting chamber and being connected to at least one outlet facing downwardly to permit said smoke to flow downwardly into said collecting chamber and toward said conveying means, and to contact a substantial portion of said collected mass of loose flocculent, dry carbon black within said chamber, and

(e) filter means above said collecting chamber and adapted to separate carbon black containing smoke into flocculent loose carbon black and an off-gas and to allow the separated carbon black when released from said filter means to fall into said collecting chamber.

4,590,040

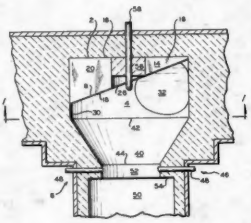
CARBON BLACK REACTOR

William R. King, Bartlesville, Okla., assignor to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 490,105, Apr. 29, 1983, Pat. No. 4,483,841. This application Jul. 27, 1984, Ser. No. 635,079

Int. Cl.[4] C01B *31/02*; C09C *1/48*

U.S. Cl. 422—156 **8 Claims**



1. A carbon black reactor having a longitudinal axis and comprising

(a) a precombustion zone defined by a sidewall in said reactor, the sidewall of the precombustion zone being of generally cylindrical shape, said precombustion zone having an upstream end and a downstream end;

(b) a plurality of tunnels each having a tunnel diameter and adapted for conveying combustion gases opening generally tangentially into the precombustion zone through the generally cylindrical sidewall; and

(c) a plurality of ramps positioned in the precombustion zone to form its upstream end, each of said ramps being formed from a refractory material having a circumferential side which follows the sidewall of the precombustion zone for a portion of its circumference, a first generally radially extending side defined between an upstream edge and a downstream edge of each of the ramps, a second generally radially extending side defined between the upstream edge and the downstream edge of each ramp and a generally planar ramp face extending between the downstream edge of the first radially extending side and the downstream edge of the second radially extending side and meeting the circumferential side along a generally helically extending portion of the downstream edge of the refractory, the downstream edge of the second generally radially extending side being downstream of the downstream edge of the first generally radially extending side, one of the ramps positioned in the precombustion zone for each of the tunnels with the tunnel opening into the precombustion zone slightly downstream of the helically extending portion of the downstream edge of the ramp.

4,590,041

GAS BAG INFLATORS

Robert W. Hill, Pleasant View, Utah, assignor to Morton Thiokol, Inc., Chicago, Ill.

Filed Nov. 21, 1984, Ser. No. 674,102

Int. Cl.[4] B01J *1/00*; B60R *21/28*

U.S. Cl. 422—165 **9 Claims**

1. A pyrotechnic gas generator comprising two parts fixed relatively to each other and having wall means defining three concentric chambers including an inner chamber and surrounding intermediate and outer annular chambers with interconnecting passageways between said chambers and exit port means out of the outer chamber for the flow of generated gas, ignition means positioned in the inner one of said chambers, a pyrotechnic charge of pellets of uniform size contained within the intermediate one of said chambers, said pellets providing a predetermined burning surface area but tending as the result of age and vibration to settle one against

another to produce a powder of larger surface area than said predetermined surface area,

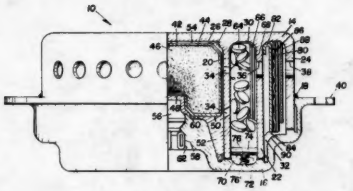
an annular plate positioned between said pellets and one of said parts in the intermediate one of said chambers, said plate being normally spaced from said one of said parts and having a resilient surface on the side adjacent said pellets,

spring means positioned between said annular plate and said one of said parts and operative to exert a substantially constant pressure on said plate, said plate being sufficiently loose in the intermediate one of said chambers to be capable of being moved in response to any slack in said pellets to maintain said pellets in a snug fit but not enough to crush them, and

filter and cooling means contained in said outer chamber,

whereby the initial shock wave of expanding gases caused by ignition of said pyrotechnic charge is partially spent in forcing said plate to compress said spring means to temporarily enlarge the volume of said intermediate annular chamber thereby effecting a somewhat gentler discharge of gas through said outer annular chamber and the exit port means thereof.

6. A pyrotechnic gas generator comprising two parts fixed relatively to each other and having wall means defining three concentric chambers including an inner chamber and surr-



rounding intermediate and outer annular chambers with interconnecting passageways between said chambers and exit port means out of the outer chamber for the flow of generated gas, ignition means positioned in the inner one of said chambers, a pyrotechnic charge of pellets of uniform size contained within the intermediate one of said chambers, said pellets providing a predetermined burning surface area but tending as the result of age and vibration to settle one against another to produce a powder of larger surface area than said predetermined surface area, an annular plate positioned between said pellets and one of said parts in the intermediate one of said chambers, said plate being normally spaced from said one of said parts and having a resilient surface on the side adjacent said pellets, spring means positioned between said annular plate and the other one of said parts and operative to exert a substantially constant pressure on said plate, said plate being sufficiently loose in the intermediate one of said chambers to be capable of being moved in response to any slack in said pellets to maintain said pellets in a snug fit but not enougn to crush them, and filter and cooling means contained in said outer chamber, whereby the intial shock wave of expanding gases caused by ignition of said pyrotechnic charge is partially spent in forcing said plate to compress said spring means to temporarily enlarge the volume of said intermediate annular chamber thereby effecting a somewhat gentler discharge of gas through said outer annular chamber and the exit port means thereof.

4,590,042

PLASMA REACTOR HAVING SLOTTED MANIFOLD

David J. Drage, Sebastopol, Calif., assignor to Tegal Corporation, Novato, Calif.

Filed Dec. 24, 1984, Ser. No. 685,650

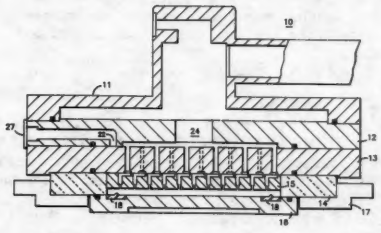
Int. Cl.[4] B01J *19/08;* **C23C** *14/00;* **C23F** *1/02*

U.S. Cl. 422—186.06 **13 Claims**

1. A plasma reactor comprising:

a gas manifold plate having a first slot for supplying gas and a second slot for exhausting gas;

a distribution plate having a plurality of gas supply slots and a plurality of gas exhaust slots,



said plates being in contact with each other with the slots of one plate not being parallel to the slots in the other plate.

4,590,043

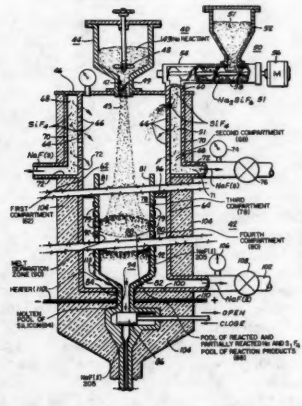
APPARATUS FOR OBTAINING SILICON FROM FLUOSILICIC ACID

Angel Sanjurjo, San Jose, Calif., assignor to SRI International, Menlo Park, Calif.

Filed Dec. 27, 1982, Ser. No. 453,734

Int. Cl.[4] C30B *15/10*

U.S. Cl. 422—189 **13 Claims**



1. A system for producing low cost, high purity, solar grade silicon by reaction of gaseous silicon tetrafluoride with sodium in substantially stoichiometric quantities to produce a reaction product from which silicon is recovered and wherein said fluoride gas used in the reaction is obtained by thermal decomposition of sodium fluosilicate which is precipitated from aqueous fluosilicic acid generated from phosphate rock conversion to fertilizer, said system including: a chemical reactant feed section and a reactor section; said reactor section including first and second reactant receiving compartments having a common wall with passages therethrough of a size to allow easy vapor transport; said chemical feed section having first reactant delivery means to introduce a first reactant into said first reactant receiving compartment and a second reactant delivery means to deliver a second reactant into said second reactant receiving compartment; and means to decompose reactant delivered to said second reactant receiving compartment thereby to generate a vapor phase reactant and cause vapor transport between said second and first reactant receiv-

ing compartments whereby reaction between said vapor phase reactant and reactant delivered to said first reactant receiving compartment reacts to produce reaction products including silicon, said reaction products being directed into a reaction product receiving and melt separation compartment having heating means surrounding said reaction product receiving and melt separation compartment so as to maintain said reaction products in the melt and facilitate separation of said reaction products.

4,590,044

MULTISTAGE REACTOR FOR EXOTHERMIC OR ENDOTHERMIC CHEMICAL PROCESSES

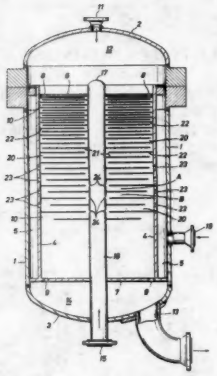
Arie L. Mos, and Franciscus H. J. Bukkems, both of The Hague, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Oct. 7, 1983, Ser. No. 539,897

Claims priority, application Netherlands, Oct. 7, 1982, 8203894

Int. Cl.[4] B01J *10/00, 14/00;* **F28D** *21/00*

U.S. Cl. 422—191 **9 Claims**



1. A multi-stage reactor apparatus suitable for exothermic and endothermic chemical reactions between at least two reaction components which reactor comprises:

(A) a closed reactor shell confining a reaction space wherein said reaction space contains a plurality of reaction stages,

(B) a first inlet means for a first reaction component in direct fluid communication with said reaction space, for directing said first component solely into a first reaction stage and capable of being connected to a first reaction component source,

(C) a second inlet means for a second reaction component, said second inlet means being an axially aligned conduit within said reaction space and in direct fluid communication with each of the reaction stages and capable of being connected to a second reaction component source,

(D) a plurality of reaction component guiding means consisting of successive radially disposed lamellae within said space defining a zigzag path through a plurality of interconnected reaction stages through which the first reaction component steam passes in succession from said first to a final reaction stage, wherein each reactor stage consists of the portion of reaction space between three successive lamellae, wherein two lamellae of each reactor stage are attached to the reactor shell, while another lamellae is attached within said reaction space to said second inlet means, said another lamellae being situated between the aforementioned two lamellae, and adjoining the inlet of one of the reaction components, and the number of sequential reaction stages is in the range from about 10 to 25,

(E) a third inlet means for a temperature moderating component in direct fluid communication with a substantial number of said interconnected reaction stages, said third inlet means being capable of being connected to a temperature moderating source, and

(F) reaction mix outlet means disposed in direct fluid communication with the final reaction stage,

whereby during operation of the reactor, the reaction temperature within said reaction space can be maintained relatively constant.

4,590,045

MOVABLE CATALYST BED REACTOR

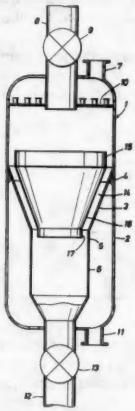
Hans van der Wal, and Hendrik J. Scheffer, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Feb. 19, 1985, Ser. No. 702,978

Claims priority, application United Kingdom, Mar. 8, 1984, 8406062

Int. Cl.[4] B01J *8/12, 35/04*

U.S. Cl. 422—216 **4 Claims**



1. An apparatus comprising an intermittently movable catalyst bed reactor to prepare hydrocarbons therein from a hydrocarbon reactant in the presence of catalyst particles wherein a hydrocarbon reaction product is formed within said reactor and said product and said catalyst particles are separated by a screening means within said reactor to form a catalyst particles withdrawal stream and a hydrocarbon product stream, which apparatus prevents passage of catalyst fines or broken particles of catalyst to pass in accompaniment with said hydrocarbon product stream and which apparatus comprises:

(a) a normally vertical extending substantially cylindrical reactor vessel having an upper part, a lower part, interior side walls and exterior side walls wherein said catalyst particles and said hydrocarbon reaction product pass into, through and out of said reactor vessel;

(b) a separate catalyst inlet means in the upper part of said cylindrical reactor vessel for admission of catalyst particles to said reactor vessel;

(c) a separate hydrocarbon reactant inlet means in the upper part of said cylindrical reactor vessel for admission of hydrocarbon reactant to said reactor vessel;

(d) a separate catalyst discharge means having variable catalyst flow control means in the lower part of said cylindrical vessel for withdrawal of nearly the entire quantity of catalyst particles added through said separate catalyst inlet means;

(e) a separate reaction product discharge means in the lower part of said cylindrical vessel for withdrawal of said hydrocarbon reaction product;

(f) a catalyst bed support means in communication with said

interior side walls of said cylindrical vessel and comprising a cylindrical wall, a first conical surface and a lower wall for passing downwardly both hydrocarbon reactant and catalyst particles;

(g) a second conical surface positioned in an acute angle in the range of 15°–45° with respect to said interior and exterior vertical side walls of said reactor vessel and being positioned parallel to said conical surface of element (f) to form a substantially constant distance between said first and said second conical surface over the full length of passage to permit passage of integral solid particles in an unbroken state as a result of the minimum shear stress placed thereon;

(h) a second conical surface support means communicating with said second conical surface and interior side walls of said reactor vessel;

(i) a screen means communicating with said catalyst bed and situated below said first and second evenly spaced conical surfaces with apertures therein for prevention of passage of said catalyst particles and for passage therethrough of said hydrocarbon reaction product and wherein said integral solid particles pass through said constant distance between said first conical surface and said second conical surface to form a protecting layer of integral solid particles immediately juxtaposed to said screen means aperatures and thereby act to shield said screen means against the flow of irregularly shaped or broken catalyst particles through said aperatures of said screen means; and

(j) a fluid collection space situated intermediate said screen means and said separate reaction product discharge means to collect said hydrocarbon product fluid stream before said stream is passed to said separate reaction product discharge means for withdrawal of reaction product without accompaniment and substantially free of broken or irregular shaped catalyst particles.

4,590,046

METHOD FOR THE PURIFICATION OF FLUE GASES

Bengt Edwall, Skurup, and Hans Karlsson, Lund, both of Sweden, assignors to Sydkraft AB, Malmo, Sweden

Filed Jan. 13, 1984, Ser. No. 570,653

Claims priority, application Sweden, Jun. 14, 1983, 8303381

Int. Cl.⁴ C01B *17/00*

U.S. Cl. 423—242 **5 Claims**

1. In a method for spray-drying absorption purification of flue gases containing sulphur dioxide and oxygen by separating from the flue gases sulphur dioxide by treating with calcium compounds, removing dry solids containing substantially calcium sulphate resulting from the oxidation of calcium sulphite by oxygen, and recirculating the solids to a reactor, the improvement comprising:

introducing finely wet-ground limestone having a specific surface of at least 12 m^2/g in the form of a water suspension into the reactor;

mixing an oxygen-bearing medium and an acidifying agent with the recirculated solids and the limestone to produce a reaction suspension;

contacting the flue gases with said reaction suspension to vaporize the water in the suspension, form calcium sulphite, and oxidize the calcium sulphite to produce said dry solids containing substantially calcium sulphate; and

said oxidation being promoted by said acidifying agent.

4,590,047

METHOD FOR DESULFURIZING COMBUSTION GASES

Francis M. Donnelly, deceased, late of Saint Petersburg, and by Marion Y. Donnelly, heir, 4570 Overlook Dr., Saint Petersburg, both of Fla. 33703

Division of Ser. No. 327,931, Dec. 7, 1981, Pat. No. 4,400,355. This application Aug. 19, 1983, Ser. No. 524,884

Int. Cl.⁴ C01B *17/00, 21/00, 17/82*

U.S. Cl. 423—242 **10 Claims**

1. A process for removing sulfur oxides from heated gaseous combustion products resulting from the burning of sulfur-containing coal, said combustion products containing sulfur dioxide, nitrogen oxides, water vapor and fly ash, comprising the steps of:

(a) passing said heated gaseous combustion products through an electrostatic precipitator for removal of fly ash;

(b) introducing said gaseous combustion products into an enclosed reaction chamber at a temperature of at least about 150° C.;

(c) maintaining a reservoir of sulfuric acid in the bottom of said reaction chamber;

(d) introducing atomic oxygen and air into said chamber, said atomic oxygen being introduced in an amount less than the stoichiometric equivalent of said sulfur dioxide and nitrogen oxides;

(e) subjecting said combustion products, atomic oxygen and air in said chamber to a plurality of confined, upwardly spiralling vortical movements in series at a rotational velocity of 2,000 to 12,000 feet (610 to 3,660 meters) per minute, each vortex being of sufficient magnitude to rupture the surface tension of the sulfuric acid in said reservoir, thereby causing said vortex to atomize and elevate said sulfuric acid and to entrain and intimately intermix said gaseous combustion products, atomic oxygen and air therewith;

(f) impacting the mixture at the top of each vortex against rapidly rotating surfaces whereby to discharge said mixture outwardly to fall by gravity into said reservoir, thereby converting sulfur dioxide to sulfur trioxide and absorbing said sulfur trioxide in said sulfuric acid;

(g) discharging the remaining gases from said reaction chamber into at least one additional enclosed reaction chamber connected in series therewith; and

(h) repeating steps (e) and (f) in said additional reaction chamber, the dwell time of said mixture in said chambers being sufficient to permit substantially complete conversion of sulfur dioxide to sulfur trioxide and absorption of said sulfur trioxide in said sulfuric acid, whereby to reduce the sulfur oxide content of the discharged remaining gases to a level of about 100 ppm.

4,590,048

REMOVAL OF SULFUR OXIDES FROM GAS STREAMS WITH AMMONIUM SULFITE

Albert W. Spitz, Glenside, Pa., assignor to Milpat Corporation, Glenside, Pa.

Continuation-in-part of Ser. No. 511,533, Jul. 7, 1983, abandoned. This application Dec. 5, 1984, Ser. No. 678,420

Int. Cl.⁴ C01B *17/00*; C01C *1/24*

U.S. Cl. 423—242 **8 Claims**

1. A process for removal of sulfur oxides from sulfur oxide containing flue gases comprising

scrubbing the flue gases in the first stage scrubber with an ammomium sulfite solution to remove most of the sulfur oxides and producing a liquor comprising ammonium sulfite, bisulfite and sulfate salts;

recycling the liquor in the first stage scrubber and producing a 40% to 50% solution of dissolved ammonium sulfite, bisulfite and sulfate salts in a first stage reservoir while maintaining the pH between about 5 and 5.8;

maintaining the ratio of bisulfite to sulfite between approximately 2.3 to 1 and 1 to 1 without liberating ammonia;

removing portions of the 40% to 50% solution of dissolved salts from the first stage reservoir;

scrubbing the flue gases in a second stage scrubber with an ammonium sulfite solution of pH between 6.2 and 6.8 to remove additional sulfur oxides and producing a dilute liquor of 1% to 10% solids comprising ammonium sulfite, bisulfite and sulfate salts in a second stage reservoir; and

pumping the dilute liquor from the second stage reservoir to the first stage reservoir in amounts sufficient to replace the said removed portions.

4,590,049

METHOD FOR DRY DESULFURIZATION OF EXHAUST GAS

Gernot Staudinger, Kserinpasse 37, A8010 Graz, Austria

Filed Aug. 14, 1984, Ser. No. 640,608
Claims priority, application Austria, Aug. 16, 1983, 2935/83
Int. Cl.[4] C01B *17/00;* B01J *8/00*
U.S. Cl. 423—244 12 Claims

1. Method for the desulfurization of ash-containing exhaust gas of a sulfur-containing coal in a coal burning, steam generating furnace, which comprises:

charging the furnace with powdered limestone which during the burning of the coal is split into CaO particles and CO_2, the CaO particles absorbing SO_2 resulting from the burning of the sulfur-containing coal and forming particles with $CaSO_3$ or $CaSO_4$ on at least the surfaces thereof;

separating particulate matter, including CaO without and CaO with $CaSO_3$ or $CaSO_4$ on at least the surfaces thereof, from the exhaust gas;

mechanically crushing the thus-separated particulate matter, whereby CaO of the particles becomes exposed;

classifying the particulate matter into larger and smaller particles;

subjecting the thus-separated and crushed particulate matter to dry steam which reacts with the exposed CaO to hydrate the same and convert the CaO into $Ca(OH)_2$; and

recycling particles of the thus-obtained $Ca(OH)_2$, $CaSO_3$, and $CaSO_4$ to the exhaust gas at an exhaust gas temperature which has been cooled to substantially the outlet temperature of the gas.

4,590,050

SYNTHESIS OF CRYSTALLINE ALUMINUM PHOSPHATES WITH A UREA TEMPLATING AGENT

Clarence D. Chang, Princeton, and Joseph N. Miale, Lawrenceville, both of N.J., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Dec. 20, 1984, Ser. No. 684,413
Int. Cl.[4] C01B *25/36*
U.S. Cl. 423—305 4 Claims

1. A method for preparing a microporous crystalline aluminum phosphate, the framework of said aluminum phosphate having the formula $AlPO_4$, the framework positive charge on phosphorus being balanced by corresponding negative charge on aluminum, said method comprising forming a reaction mixture capable of forming said aluminum phosphate, said reaction mixture comprising sufficient sources of Al_2O_3, P_2O_5 and a urea templating agent, said urea templating agent being of the formula, $CO(NH_2)_2$, said method further comprising maintaining said reaction mixture under sufficient crystallization conditions until crystals of said aluminum phosphate are formed, said aluminum phosphate having the X-ray diffraction characteristics corresponding to the data set forth in Table 1.

3. A microporous crystalline aluminum phosphate having the X-ray diffraction characteristics corresponding to the data set forth in Table 1, the framework of said aluminum phosphate having the formula $AlPO_4$, the framework positive charge on phosphorus being balanced by corresponding negative charge on aluminum.

4,590,051

SODIUM TRIPOLYPHOSPHATE MANUFACTURE

Lawrence A. Shimp, Robbinsville, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Filed Oct. 31, 1984, Ser. No. 666,932
Int. Cl.[4] C01B *25/30*
U.S. Cl. 423—315 5 Claims

1. In the process of producing sodium tripolyphosphate wherein a make up liquor of sodium orthophosphate is made up having an Na:P ratio of about 5:3 and heated in a heating zone to produce sodium tripolyphosphate, the improvement comprising adding to said make up liquor from about 0.01 to about 0.1 weight percent of hydrogen peroxide, based on the final weight of the sodium tripolyphosphate produced, and allowing the treated make up liquor to remain for at least about 30 minutes before being heated in said heating zone, whereby dark oily residues are prevented from forming on the surface of an aqueous solution of said sodium tripolyphosphate.

4,590,052

PRECIPITATED SILICA HAVING IMPROVED MORPHOLOGICAL CHARACTERISTICS AND PROCESS FOR THE PRODUCTION THEREOF

Yvonick Chevallier, Decines, and Jean-Claude Morawski, Chasseu, both of France, assignors to Rhone-Poulenc Chimie de Base, France

Filed Apr. 5, 1985, Ser. No. 720,399
Claims priority, application France, Apr. 6, 1984, 84 05460
Int. Cl.[4] C09C *1/30*
U.S. Cl. 423—335 19 Claims

1. A precipitated silica having a BET surface area of between about 50 and 350 m^2/g, a CTAB specific area between 50 and 350 m^2/g and a value of oil absorption (DBP) such that the ratio of DBP/CTAB is between:

7 and 4 for a CTAB range between 50–100 m^2/g;

4 and 2.5 for a CTAB range between 100–200 m^2/g;

2.5 and 2 for a CTAB range between 200–250 m^2/g;

2 and 1.5 for a CTAB range between 250–300 m^2/g; and

1.5 and 1.2 for a CTAB range between 300–350 m^2/g.

4,590,053

METHOD FOR PRODUCING α-FORM SILICON NITRIDE FINE POWDERS

Tadanori Hashimoto, Takatsuki; Kazuhiko Nakano, Katano; Masaaki Hama, Toyonaka, and Norio Matsuda, Ibaraki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation-in-part of Ser. No. 629,113, Jul. 9, 1984, abandoned. This application Jun. 24, 1985, Ser. No. 747,851
Claims priority, application Japan, Jul. 14, 1983, 58-128897; Sep. 21, 1984, 59-199132
Int. Cl.[4] C01B *21/068*
U.S. Cl. 423—344 4 Claims

1. A method for producing a fine powder of α-form silicon nitride of nearly spherical shape having an average particle diameter of 0.3 to 1.0 μm, and essentially uncontaminated with needle-like and rod-like crystals characterized in that an additive which is a mixture of 0.001 to 0.1 part, in terms of the total element weight, of at least one of Mg, Ca and compounds of these metals and 0.01 to 1 part by weight of a silicon nitride powder having a BET specific surface area of 15 to 50 m^2/g and being composed substantially of α-form crystals is mixed with 1 part by weight of silicon oxide powder having an average particle diameter of 1 to 100 μm and with 0.4 to 4 parts by weight of a carbon powder and the mixture is heat-treated in a nitrogen-containing atmosphere at a temperature of from 1400° to 1600° C. to reduce and convert the silicon oxide into said fine powder of α-form silicon nitride.

4,590,054

PROCESS FOR PREPARING POLY(TETRAMETHYLENE ETHER) GLYCOL

William W. Kasper, Wilmington, Del.; Willard L. Quon, East Amherst, and Timothy D. Van Domelen, Amherst, both of N.Y., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 644,436, Aug. 27, 1984. This application Sep. 16, 1985, Ser. No. 776,861
Int. Cl.[4] C01F *7/50;* C01B *17/45;* C23F *11/04;* C07C *43/11*
U.S. Cl. 423—467 2 Claims

1. A method for reducing the formation of iron sulfite in fluosulfonic acid during shipment in steel containers, the method comprising adding about shoichiometric amount of water to the fluosulfonic acid, before shipment, to react with substantially all of the sulfur trioxide in the fluosulfonic acid.

4,590,055
PITCH-BASED CARBON FIBERS AND PITCH COMPOSITIONS AND PRECURSOR FIBERS THEREFOR

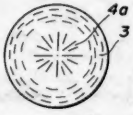
Yasuhiro Yamada; Takeshi Imamura, both of Tosu; Hidemasa Honda, Tokyo; Toru Sawaki, and Hideharu Sasaki, both of Iwakuni, all of Japan, assignors to Director-General of the Agency of Industrial Science and Technology, Tokyo, Japan

Filed Aug. 23, 1983, Ser. No. 525,702

Claims priority, application Japan, Aug. 24, 1982, 57-147036; Aug. 24, 1982, 57-147037; Aug. 24, 1982, 57-147038; Sep. 16, 1982, 57-161431

Int. Cl.[4] D01F 9/12

U.S. Cl. 423—447.4 10 Claims



1. A method for the preparation of a pitch composition for spinning containing at least 30% by weight of quinoline-soluble fraction, the average molecular weight of the quinoline-soluble fraction being in the range from 700 to 1700, and having a density of 1.29 to 1.40 g/cm^3 at 20° C. and an aromaticity index of 0.45 to 0.9, which comprises the steps of admixing 100 parts by weight of a bituminous material with 30 to 100 parts by weight of tetrahydroquinoline, heating the mixture at a temperature in the range from 300° to 500° C. for 10 to 60 minutes and further heating the mixture at a temperature in the range from 450° to 550° C. for 5 to 60 minutes after or with simultaneous removal of the tetrahydroquinoline.

10. A method for the preparation of a pitch-based carbon fiber having a tensile strength of at least 200 kg/mm^2 and a tensile modulus of at least 10 tons/mm^2 which comprises the steps of producing a pitch composition containing at least 30% by weight of quinoline-soluble fraction, the average molecular weight of the quinoline-soluble fraction being in the range from 700 to 1700, and having a density of 1.29 to 1.40 g/cm^3 at 20° C. and an aromaticity index of 0.45 to 0.9, said composition being produced by the method comprising the steps of admixing 100 parts by weight of a bituminous material with 30 to 100 parts by weight of tetrahydroquinoline, heating the mixture at a temperature in the range from 300° to 500° C. for 10 to 60 minutes and further heating the mixture at a temperature in the range from 450° to 550° C. for 5 to 60 minutes after or with simultaneous removal of the tetrahydroquinoline, spinning the pitch composition to form a pitch filament characterized by X-ray crystallographic parameters of the angle of orientation in the range from 30° to 50°, the crystallite size in the range from 2.5 to 4.0 nm and the interlamellar distance in the range from 0.343 to 0.350 nm, infusibilizing the pitch filament by heating at a temperature from 250° to 350° C. for 5 to 350 minutes in the presence of oxygen, and carbonizing the thus infusilibized pitch filament by heating at a temperature of 1000° to 1500° C. for 10 to 30 minutes in an inert atmosphere.

4,590,056
METHOD OF MAKING CARBON BLACK HAVING LOW ASH CONTENT FROM CARBONACEOUS MATERIALS

Wenjai R. Chen, and Robert L. Savage, both of Athens, Ohio, assignors to Ohio University, Athens, Ohio

Filed Mar. 1, 1985, Ser. No. 707,258

Int. Cl.[4] C01B 31/02; C09C 1/48; C07C 1/02

U.S. Cl. 423—449 10 Claims

1. A partial combustion method of producing commercially acceptable carbon black containing less than approximately one percent ash from carbonaceous material taken from the group consisting of coal, lignites, tar sand, pitch, oil shale and asphaltic substances, which comprises reacting said carbonaceous material with oxygen at a temperature of from 2200° F. to 3000° F., said carbonaceous material having an average particle size of from 75 microns to 1700 microns and wherein the oxygen to carbonaceous material weight ratio is no more than 0.4, and recovering said carbon black from said reaction.

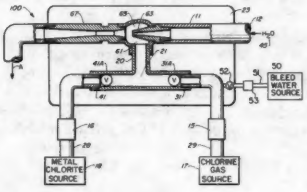
4,590,057
PROCESS FOR THE GENERATION OF CHLORINE DIOXIDE

Bruce W. Hicks, Rio Linda, Calif., assignor to Rio Linda Chemical Co., Inc., Sacramento, Calif.

Filed Sep. 17, 1984, Ser. No. 651,167

Int. Cl.[4] C01B 11/02

U.S. Cl. 423—477 10 Claims



1. A process for the generation of chlorine dioxide comprising the steps:

a. substantially instantaneously reacting a relatively concentrated aqueous solution of a metal chlorite having a concentration of about 5 to about 35 weight percent metal chlorite and gaseous chlorine in a reaction zone sized to permit substantially instantaneous reaction of said reactants and wherein said gaseous chlorine contains about 0.3 to about 10.0 grams of bleed water per gram of chlorine; and

b. transferring the generated chlorine dioxide from said reaction zone to another location by continuously educting said chlorine dioxide to avoid a buildup thereof by suction generated by the movement of a diluting fluid through a venturi, the flow rate of said diluting fluid being correlated to the flow rates of the reactants to thereby avoid any buildup of chlorine dioxide in said reaction zone.

4,590,058
PROCESS FOR PRODUCING HIGH PURITY SOLUTIONS OF ALKALI METAL HYDROSULFITES

David W. Cawlfield, Cleveland, Tenn., assignor to Olin Corporation, Cheshire, Conn.

Filed Feb. 21, 1985, Ser. No. 703,780

Int. Cl.[4] C01B 17/66

U.S. Cl. 423—515 19 Claims

15. A continuous process for the production of high purity solutions of an alkali metal hydrosulfite which comprises:

(a) feeding an alcohol-free aqueous solution of an alkali metal hydrosulfite containing at least 1% by weight of an alkali metal thiosulfate as an impurity to a crystallizing zone,

(b) producing a slurry of alkali metal hydrosulfite hydrate crystals in said crystallizing zone,

(c) conveying said slurry of alkali metal hydrosulfite hydrate crystals from said crystallizing zone to a separating zone at a rate greater than one times the volume of the crystallizing zone per hour,

(d) separating in a first separating zone employing a non-gravitational separation means a first slurry of alkali metal hydrosulfite hydrate crystals from a first mother liquor,

(e) conveying a first portion of said first slurry of alkali metal hydrosulfite hydrate crystals to a concentrating zone to recover a cake of alkali metal hydrosulfite hydrate crystals from a second mother liquor,

(f) conveying a second portion of said first slurry of alkali metal hydrosulfite hydrate crystals to a second separating

zone employing non-gravitational separation means to separate a second slurry of alkali metal hydrosulfite hydrate crystals having a size larger than about 5 microns from a third mother liquor,

(g) conveying said second slurry of alkali metal hydrate crystal to said crystallizing zone, and

(h) admixing the cake of alkali metal hydrosulfite hydrate crystals with water in a dissolving zone to produce a purified solution of an alkali metal hydrosulfite having reduced concentrations of said alkali metal thiosulfate of less than 0.7% by weight as an impurity.

4,590,059

PROCESS FOR THE PRODUCTION OF MANGANESE DIOXIDE

Geoffrey W. Mellors, North Royalton, Ohio, assignor to Union Carbide Corporation, Danbury, Conn.

Continuation of Ser. No. 698,745, Feb. 6, 1985, abandoned, which is a continuation of Ser. No. 537,564, Sep. 30, 1983, abandoned. This application Jun. 27, 1985, Ser. No. 749,265

The portion of the term of this patent subsequent to Oct. 9, 2001, has been disclaimed.

Int. Cl.⁴ C01G *45/02*

U.S. Cl. 423—605 **11 Claims**

1. A process for the production of manganese dioxide comprising the steps of:

(a) mixing at least one manganous salt (Mn^{2+}) with at least one compound (MnO_4^-) selected from the group consisting of alkali metal permangantes and ammonium permanganate to produce a homogeneous solid mixture;

(b) heating the homogeneous mixture of step (a) to between about 120° C. and about 180° C. in an oxygen-containing atmosphere until at least 85% of the manganous salt is converted into manganese dioxide; and

(c) heating the product produced in step (b) in an oxygen-containing atmosphere at between about 210° C. and about 300° C. until the surface area of the manganese dioxide is between about 3 square meters per gram and about 12 square meters per gram.

4,590,060

AGENT FACILITATING LIPOSOME CELLULAR WALL TRANSPORT, A METHOD FOR THE PRODUCTION THEREOF AND ITS USE

Udo Ehrenfeld, Furtmayrstrasse 20, 8400 Regensburg, Fed. Rep. of Germany

Filed Dec. 2, 1983, Ser. No. 557,738

Claims priority, application Fed. Rep. of Germany, Sep. 26, 1983, 3334751; Oct. 7, 1983, 3336583

Int. Cl.⁴ A61K *43/00, 49/00*

U.S. Cl. 424—1.1 **26 Claims**

1. A method of facilitating the transport of liposomes through cellular walls comprising the step of administering to a mammal a liposome cellular wall transport facilitating amount of an aldehyde of formula I

$$RCHO \quad (I)$$

in which R is a hydrogen atom or a straight-chain or branched hydrocarbon group having 1 to 4 carbon atoms or an aldehyde derivative or a chemical compound metabolisable to said aldehyde in combination with an alcohol of formula II

$$R'CH_2OH \quad (II)$$

in which R' is a hydrogen atom or a straight-chain or branched hydrocarbon group having 1 to 4 carbon atoms and liposomes.

8. A method according to claim 1 wherein a liposome is thereafter administered.

9. A method according to claim 8 wherein the liposome carries a dyestuff, a radioactive tracer, a radioactive tracer and a dyestuff, a cytostatic, a radioactive radiator, a radioactive radiator and/or an immune modulator, or a cytostatic and a radioactive radiator.

4,590,061

ANTIMICROBIAL PLAQUE DISCLOSING AGENT

George L. Southard, Fort Collins, Colo., assignor to Vipont Laboratories, Inc., Fort Collins, Colo.

Continuation-in-part of Ser. No. 566,916, Dec. 29, 1983, Pat. No. 4,517,172. This application May 10, 1985, Ser. No. 732,651

Int. Cl.⁴ A61K *7/26, 35/78*

U.S. Cl. 424—7.1 **12 Claims**

1. A method for visualizing plaque formation in the oral cavity and rendering such plaque formation visible to the naked eye under long wavelength ultraviolet light without employing fluorescent or other disclosing dyes or stains by first applying to the teeth, with plaque formation, in the oral cavity a non-toxic benzo-c-phenanthridine salt and then exposing the teeth to longwave UV light, in order to thereby disclose the plaque on the teeth.

4,590,062

DRY DIRECT COMPRESSION COMPOSITIONS FOR CONTROLLED RELEASE DOSAGE FORMS

Choong-Gook Jang, Short Hills, N.J., assignor to Tech Trade Corp., New Brunswick, N.J.

Continuation-in-part of Ser. No. 600,472, Apr. 16, 1984, abandoned, which is a continuation of Ser. No. 535,604, Sep. 26, 1983, abandoned, which is a continuation-in-part of Ser. No. 499,221, May 31, 1983, abandoned, which is a continuation-in-part of Ser. No. 419,409, Sep. 17, 1982, abandoned, which is a continuation-in-part of Ser. No. 316,993, Nov. 2, 1981, abandoned, which is a continuation-in-part of Ser. No. 147,929, May 8, 1980, abandoned, which is a continuation-in-part of Ser. No. 045,856, Jul. 5, 1979, abandoned, which is a continuation-in-part of Ser. No. 034,580, Apr. 30, 1979, abandoned. This application Jul. 6, 1984, Ser. No. 628,410

Int. Cl.⁴ A61K *9/20, 9/22, 9/26*

U.S. Cl. 424—19 **8 Claims**

1. A dry, direct compressed product containing controlled release dosage forms of therapeutically active particulate agents and produced without heat or solvents by the steps comprising: (a) dry blending blend particles of a particle size smaller than 20 mesh and consisting essentially of from 0.01 to 95 parts by weight of biologically active particulate solids with from 5 to 99.99 weight parts of a matrix blend combination consisting essentially of from 1 to 96 parts by weight of a hydrophobic carbohydrate polymer selected from the group consisting of ethyl cellulose, propyl cellulose, cellulose acetate, cellulose propionate, cellulose acetate-butryate and cellulose acetate-propionate and from 4 to 99 parts by weight of a digestive-difficulty soluble component selected from the group consisting a wax selected from the group consisting of carnauba wax, spermceti, beeswax, candelilla wax, esparto and paraffins; a fatty acid material selected from the group consisting of fatty acids having from 12 to 28 carbon atoms, fatty monoalcohols having 12 to 28 carbon atoms, and fatty amides and amines having from 12 to 28 carbon atoms; a neutral lipid selected from the group consisting of stearin, palmitin, castorwax, phospholipids, glycolipids, glycerides, hydrogenated cottonseed oil, hydrogenated tallow and metal and organic salts of fatty acids having from 11 to 28 carbon atoms; and, mixtures thereof into a first blend; (b) compressing said first blend under a pressure of 1.5 to 20 tons per square inch; and, (c) thereafter, recovering said first blend as a compressed product having a hardness of 4 to 25 kg and excellent resistance to delamination when subjected to an external longitudinal force.

4,590,063

ANTICONVULSANTS

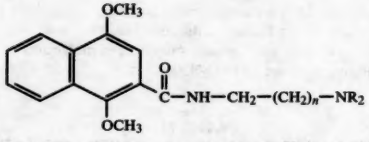
John P. Carter, Jr., Columbus, and Richard L. Wolgemuth, Plain City, both of Ohio, assignors to Adria Laboratories, Inc., Columbus, Ohio

Division of Ser. No. 507,620, Jun. 24, 1983, Pat. No. 4,540,814. This application Apr. 25, 1985, Ser. No. 727,048

Int. Cl.[4] A61J *3/06;* A61K *9/14, 9/16;* B32B *5/16*

U.S. Cl. 424—19 6 Claims

1. A sustained release composition comprising microparticles having a size below 20 microns of an agent comprising 1,4-dimethoxy naphthalenecarboxamide having the general formula



wherein R is selected from the group consisting of methyl, ethyl and propyl groups and n is a whole number from 1 to 2 and its nontoxic salts, microencapsulated in a solid protective coating of a cellulose ether.

4,590,064

ANTICALCULUS ORAL COMPOSITION

Abdul Gaffar, Somerset, N.J., assignor to Colgate-Palmolive Company, New York, N.Y.

Filed Mar. 11, 1985, Ser. No. 710,876

Int. Cl.[4] A61K *7/16, 7/18*

U.S. Cl. 424—49 11 Claims

1. In a method of effectively inhibiting crystal growth of hydroxyapatite associated with calculus by employing on teeth, without substantially decalcifying or otherwise damaging dental enamel, phosphono and carboxylic group-containing compounds, the improvement. characterized by the step of contacting the teeth in the oral cavity and then removing an oral mouthwash, toothpaste, gel or cream composition comprising an orally acceptable vehicle having a pH of about 4.5 to about 9, said composition being selected from the group consisting of such:

A. Compositions containing in an effective amount, in the range of about 0.01% to about 10% by weight, as an anticalculus agent phosphonoformic acid or an orally acceptable salt thereof, and an effective anticaries amount, in the range of about 0.01% to about 3.0% by weight, of a fluorine-providing anticaries compound, and

B. Compositions containing in an effective amount, in the range of about 0.01% to about 10% by weight, as an anticalculus agent phosphonoformic acid or an orally acceptable salt thereof, and devoid of an effective anticaries amount of a fluorine-providing anticaries compound.

4,590,065

STABLE FLAVOR-CONTAINING DENTIFRICE

Stanley E. Piechota, Jr., Somerset, and Dorinda A. Sparacio, Edison, both of N.J., assignors to Colgate-Palmolive Company, New York, N.Y.

Filed Apr. 18, 1985, Ser. No. 724,377

Int. Cl.[4] A61K *7/16, 7/18, 31/79*

U.S. Cl. 424—49 16 Claims

1. A plastic packaged toothpaste or gel dentifrice composition free of free flavor oil tending to migrate to, and be absorbed by plastic packaging and thereby having improved stability against flavor loss by migration and abosrption of free flavor oil into plastic package components comprising 0.01–5% by weight of a flavor oil colloidally bound with about 5.0% to 50.0% by weight of the total flavor oils of polyvinylpyrrolidone, dispersed in a flavor-free dental vehicle.

4,590,066

ORAL COMPOSITIONS

John J. Parran, Jr., Cincinnati, and Nabil Y. Sakkab, Loveland, both of Ohio, assignors to The Procter & Gamble Company, Cincinnati, Ohio

Continuation of Ser. No. 591,228, Mar. 19, 1984, Pat. No. 4,515,772, which is a continuation of Ser. No. 391,040, Jun. 22, 1982, abandoned. This application Feb. 19, 1985, Ser. No. 702,708

The portion of the term of this patent subsequent to May 7, 2002, has been disclaimed.

Int. Cl.[4] A61K *7/16*

U.S. Cl. 424—52 8 Claims

1. A toothpaste composition comprising:

(a) from about 10% to about 70% of which will allow for the pyrophosphate ion concentration specified below;

(b) an amount of a fluoride ion source sufficient to supply from about 50 ppm to about 3500 ppm of fluoride ions;

(c) an amount of a pyrophosphate salt selected from the group consisting of dialkali metal and mixtures of dialkali metal and tetraalkali metal pyrophosphate salts sufficient to provide at least 1.5% $P_2O_7^{-4}$; and

(d) the remainder water; wherein the pH of said composition is from about 6.0% to about 10.0 and the composition does not contain more than about 4.0% $K_4P_2O_7$.

4,590,067

TREATMENT FOR PERIODONTAL DISEASE

Lorraine F. Meisner, Madison, Wis., assignor to Peritain, Ltd., Madison, Wis.

Filed Oct. 18, 1984, Ser. No. 662,069

Int. Cl.[4] A61K *7/16, 7/22*

U.S. Cl. 424—54 15 Claims

1. A composition useful in the prevention and treatment of periodontal disease, a disease characterized by a chronic inflammation of gingival tissue leading to destruction of connective tissues surrounding the teeth, which composition comprises the following ingredients, expressed in parts per weight: a calcium source selected from the group consisting of bone meal, calcium gluconate, calcium carbonate, calcium phosphate, and dolomite, 2 to 10 parts; ascorbic acid, 1 to 5 parts; a precursor or stimulant of epinephrine or nor-epinephrine production selected from the group consisting of tyrosine and phenylalanine, 0.5 to 2.5 parts; and an anti-inflammatory substance, 1 to 5 parts, said anti-inflammatory substance being selected from the group consisting of mannose, 2-deoxy-D-glucose, glucosamine, glucosamine-6-phosphate, N-acetylglucosamine, galactosamine, cysteine, glutamine, alanine, L-tryptophan, valine and creatinine.

4,590,068

INERT CROSS-LINKED COPOLYMER SUPPORT, ITS PREPARATION PROCESS AND ITS USE FOR PRODUCING DELAYED ACTION MEDICAMENTS

Jeanne Berthet, Velizy Villacoublay; Marie-Francoise Blin, Versailles, and Gilbert Gaussens, Meudon, all of France, assignors to Compagnie ORIS Industrie S.A., Gif sur Yvette, France

Continuation of Ser. No. 278,752, Jun. 29, 1981, abandoned. This application Aug. 22, 1983, Ser. No. 525,404

Claims priority, application France, Jun. 30, 1980, 80 14529

Int. Cl.[4] A61K *31/78;* C08F *220/12, 220/20*

U.S. Cl. 424—81 8 Claims

1. A pharmaceutical composition comprising an inert support and codeine and/or 2-(3-benzoyphenyl)-propionic acid absorbed thereinto, wherein the inert support is constituted by a powder of a cross-linked copolymer of:

30–80% by weight of a mono-unsaturated alkyl acrylate and/or alkyl methacrylate wherein the alkyl acrylate is selected from the group consisting of butyl, hexyl and heptylacrylates and the methacrylate is selected from the

group consisting of methyl, ethyl, butyl, hexyl and heptyl-methacrylates;

5–68% by weight of acrylic and/or methacrylic acid; and

2–15% by weight of bifunctional or trifunctional acrylate and/or methacrylate selected from the group consisting of polyethylene glycol diacrylate, trimethylol propane triacrylate and trimethylol propane trimethacrylate, said powder having a grain size of 20–700 microns.

4,590,069

NOVEL SUBSTANTIVE MOISTURIZING DERIVATIVES OF 2-PYRROLIDONE-5-CARBOXYLIC ACID AND COMPOSITIONS CONTAINING SAME

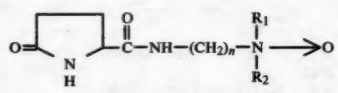
George E. Deckner, Westfield; Hedwig O'Grady, Holmdel, and Albert Zofchak, Matawan, all of N.J., assignors to Charles of the Ritz Group Ltd., New York, N.Y.

Division of Ser. No. 384,137, Jun. 1, 1982, Pat. No. 4,452,989. This application Dec. 2, 1983, Ser. No. 557,511

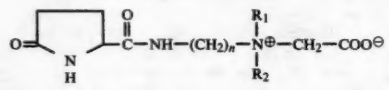
Int. Cl.[4] A61K *7/06, 47/00*

U.S. Cl. 424—70 5 Claims

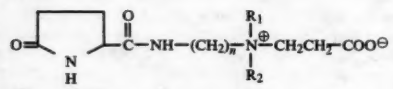
1. In an improved skin and hair moisturizing composition including a moisturizing compound and a carrier therefor, wherein the improvement comprises a moisturizing effective amount of an amine oxide moisturizing compound of the structure



wherein n is 1 to 8, R_1 and R_2 are the same or different and are lower alkyl or aralkyl, or a betaine derivative thereof having the structure



or



together with a carrier therefor which includes from about 33 to about 90.45% by weight water.

4,590,070

CONTRACEPTIVE METHODS

Eric N. Chantler, Stockport; Francis G. Hutchinson, Lymm, and Deborah A. Sharman, Hadfield, all of United Kingdom, assignors to Imperial Chemical Industries PLC, London, England

Filed Aug. 7, 1984, Ser. No. 638,555

Claims priority, application United Kingdom, Oct. 14, 1983, 8327562

Int. Cl.[4] A61K *31/74, 31/155*

U.S. Cl. 424—78 3 Claims

1. A contraceptive method which comprises applying to the mucus in the vagina of a female mammal a mucospissic, spermicidal or sperm-immobilizing amount of polymeric biguanide compound which in the form of its free base is a linear polymer in which the recurring unit is represented by the formula:

—X.NH.C(:NH)NH.C(:NH)N-
H.Y.NH.C(:NH)NH.C(:NH)NH— I

wherein X and Y stand for bridging groups in which together the total number of carbon atoms directly interposed between the adjacent nitrogen atoms is greater than 9 and less than 17, or an acid-addition salt thereof.

4,590,071

HUMAN MELANOMA SPECIFIC IMMUNOTOXINS

Patrick J. Scannon, Davis; Lynn E. Spitler, Tiburon; Howard M. Lee; Russell T. Kawahata, both of San Francisco, and Ronald P. Mischak, Palo Alto, all of Calif., assignors to Xoma Corporation, Berkeley, Calif.

Filed Sep. 25, 1984, Ser. No. 654,613

Int. Cl.[4] A61K *39/395, 39/44;* C07K *17/06*

U.S. Cl. 424—85 20 Claims

1. A cytotoxic conjugate, comprising a lectin A chain purified with anti-lectin B chain antibodies bound to a monoclonal antibody that binds substantially only human melanoma associated antigen to about 240 kD/480 kD m.w.

4,590,072

LIVE VACCINE FOR BOVINE BABESIOSIS AND METHOD OF PREPARATION

Gerald M. Buening, and Charles A. Carson, both of Columbia, Mo., assignors to Curators of the University of Missouri, Columbia, Mo.

Continuation of Ser. No. 438,641, Nov. 3, 1982, abandoned. This application Oct. 31, 1984, Ser. No. 663,844

Int. Cl.[4] A61K *39/018;* C12N *1/10*

U.S. Cl. 424—93 4 Claims

1. The method of preparing a live parasite vaccine for safe immunization of bovines against severe babesiosis infection, comprising the sequence of steps of:

(a) subjecting cultures of a mixed parasite population of viable *Babesia bovis* to a series of in vitro propagations in a cell culture medium, said mixed population including both slow-growing virulent parasites and fast-growing avirulent parasites, said parasites being contained in parasitized bovine erthrocytes in admixture with non-parasitized bovine erythrocytes;

(b) successively diluting the mixed cultures during said propagations until the final cultures contain only a single parasite per culture;

(c) separately propagating each of said single parasites in non-parasitized bovine erythrocytes under conditions effective for single parasite propagation to obtain a series of clone cultures, each clone culture containing only a homogeneous parasite population;

(d) selecting from said series a clone culture in which the parasite therein has a fast-growing characteristic;

(e) confirming that the selected fast-growing parasite has an avirulent character by administering a sample of the parasite to a non-immune bovine, and determining that the culture produces a mild infection characterized by a sharp temperature peak with the temperature falling toward normal within 24 to 48 hours after the administration; and, thereafter,

(f) propagating the confirmed avirulent clone parasite to produce vaccine doses thereof.

4,590,073

6-SUBSTITUTED PENICILLANIC ACID 1,1-DIOXIDE COMPOUNDS

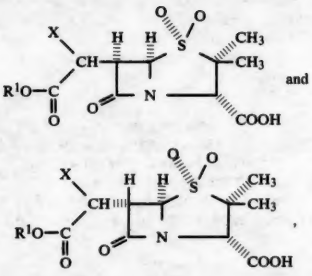
Wayne E. Barth, East Lyme, Conn., assignor to Pfizer Inc., New York, N.Y.

Continuation-in-part of Ser. No. 663,910, Oct. 22, 1984, abandoned. This application Jul. 2, 1985, Ser. No. 751,331

Int. Cl.[4] C07D *499/00;* A61K *31/415*

U.S. Cl. 424—114 23 Claims

1. A penicillanic acid 1,1-dioxide compound selected from the group consisting of



and the pharamaceutically-acceptable base salts thereof, and the pharmaceutically-acceptable esters thereof readily hydrolyzable in vivo, wherein

R^1 is selected from the group consisting of hydrogen and alkyl having 1 to 4 carbons;

X is selected from the group consisting of hydroxy, alkanoyloxy having 2 to 5 carbon atoms and amino;

and said pharmaceutically-acceptable esters thereof readily hydrolyzable in vivo are formed from an ester-forming radical selected from the group consisting of 3-phthalidyl, 4-crotonolactonyl, gamma-butyrolacton-4-yl and $—CH(R^4)—O—C(=O)—R^5$, wherein R^4 is hydrogen, methyl or ethyl and R^5 is alkyl of 1 to 5 carbons or alkoxy of 1 to 5 carbons.

4,590,074

BIS-AMIDINES

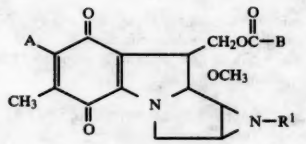
Dolatrai M. Vyas; Takushi Kaneko, and Terrence W. Doyle, all of Fayetteville, N.Y., assignors to Bristol-Myers Company, New York, N.Y.

Division of Ser. No. 672,742, Nov. 19, 1984, which is a continuation-in-part of Ser. No. 492,903, May 9, 1983, Pat. No. 4,487,769, which is a continuation-in-part of Ser. No. 385,149, Jun. 4, 1982, abandoned. This application Oct. 15, 1985, Ser. No. 787,547

Int. Cl.[4] A61K *31/40*; C07D *403/04*

U.S. Cl. 544—58.2 **7 Claims**

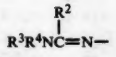
1. The process for the preparation of a compound having the formula



wherein

R^1 is hydrogen, lower alkyl, lower alkanoyl, benzoyl or substituted benzoyl wherein said substituent is lower alkyl, lower alkoxy, halo, amino, or nitro, and

A and B are different and are independently selected from the amidino group having the formula



wherein

R^2 is hydrogen, lower alkyl, phenyl, lower alkylphenyl, lower alkoxyphenyl, halophenyl, or aminophenyl,

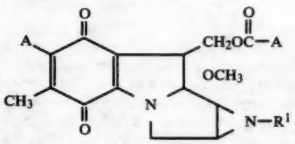
R^3 is lower alkyl, or lower alkoxy,

R^4 is lower alkyl, or

R^3 and R^4 together with the nitrogen atom to which they are attached constitute pyrrolidine, 2-, or 3-lower alkylpyrrolidine, piperidine, 2-, 3-, or 4-lower alkylpiperidine, 2,6-dilower alkylpiperidine, piperazine, 4-substituted piperazine wherein said 4-substituent is alkyl, or carbalkoxy each having 1 to 8 carbon atoms, phenyl, methylphenyl, methoxyphenyl, halophenyl, nitrophenyl, or benzyl, azepine, 2-, 3-, 4-, or 5-lower alkylazepine, morpholine, thiomorpholine, thiomorpholine-1-oxide, or thiomorpholine-1,1-dioxide, or

B is the amino formyl group (NHCHO)

which comprises contacting a compound of the formula



wherein R^1 and A have the above definitions with a secondary amine of the formula R^3R^4NH wherein R^3 and R^4 are as defined above with respect to B at a temperature of from 20° C. to 60° C. for a sufficient period of time to produce the desired compound.

4,590,075

ELASTOMER ENCAPSULATION OF FLAVORS AND SWEETENERS, LONG LASTING FLAVORED CHEWING GUM COMPOSITIONS BASED THEREON AND PROCESS OF PREPARATION

You C. Wei, Randolph; Subraman R. Cherukuri, Towaco, both of N.J.; Frank Hriscisce, Long Island City, N.Y.; Dominic J. Piccolo, Hopatcong, N.J., and Kenneth P. Bilka, Floral Park, N.Y., assignors to Warner-Lambert Company, Morris Plains, N.J.

Filed Aug. 27, 1984, Ser. No. 644,733

Int. Cl.[4] A23G *3/30*

U.S. Cl. 426—5 **45 Claims**

1. A chewing gum composition having sustained flavor and sweetener release comprising

(a) a gum base in an amount of from about 5% to about 45% by weight of said chewing gum composition to which is added;

(b) a flavor and sweetener delivery system in an amount of from about 0.2% to about 10% by weight of said chewing gum composition, said delivery system comprising flavor and/or sweetening agents encapsulated in a substantially hydrophobic matrix formed in the absence of added emulsifiers, wherein said matrix comprises:

(i) at least one elastomer in an amount of from about 3% to about 40% by weight of said matrix;

(ii) at least one wax system in an amount of from about 5% to about 24% by weight of said matrix;

(iii) at least one elastomer solvent in an amount of from about 8% to about 14% by weight of said matrix; and

(iv) an excipient selected from the group consisting of carbohydrates, polyhydric alcohols, and mixtures thereof in an amount of from about 5% to about 60% by weight of said matrix; and

(v) optionally, edible spherical food particles having microporous channels and having a bulk density of from about 2.0 to about 25.0 lbs./ft^3.

4,590,076

REDUCED CALORIE, HIGH FIBER CONTENT BREADS AND METHODS OF MAKING SAME

Stanley T. Titcomb, Portchester, and Arthur A. Juers, Baldwin, both of N.Y., assignors to Ralston Purina Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 689,449, May 24, 1976, abandoned, which is a continuation-in-part of Ser. No. 494,011, Jul. 30, 1974, Pat. No. 3,979,523. This application May 29, 1980, Ser. No. 154,242

The portion of the term of this patent subsequent to Sep. 7, 1993, has been disclaimed.

Int. Cl.[4] A21D *10/00, 13/00*

U.S. Cl. 426—62 **2 Claims**

1. A dough for making a bread product having substantially more fiber and fewer calories than conventional bread of the same type and of equal weight and volume made from conventional dough comprising conventional flour and water and a texture and eating quality substantially identical to said conventional bread, said high fiber, low calorie dough comprising:

an amount of conventional flour less than that in said conventional dough;

an amount of powdered alpha-cellulose sufficient to provide said bread product with at least 25% fewer calories than said conventional bread, wherein said powdered alpha-cellulose has a particle size such that at least 70% of the alpha-cellulose particles pass through a 200 mesh screen and said amount of said alpha-cellulose weighs about 22–25% of the weight of said amount of flour and comprises a substitute for a significant portion of the flour in said conventional dough;

an amount of gluten weighing at least 5% of the weight of said amount of flour and sufficient to substantially replace protein lost in the product by substituting said powdered alpha-cellulose for a portion of the flour in said conventional dough; and

an amount of water greater than that in said conventional dough, wherein said amount of water weighs between 110% and 125% of the weight of said amount of flour and provides said high fiber, low calorie dough with handling characteristics similar to those of said conventional dough.

2. A bread product having substantially more fiber and at least 25% fewer calories than conventional bread of the same type and of equal weight and volume and a texture and eating quality substantially identical to said conventional bread, wherein said bread product is made from the dough recited in claim 1.

4,590,077

POWDERED COMPOSITION FOR MAKING ACIDIFIED MILK PRODUCTS

Moshe Trop, Beer Sheva, Israel, assignor to Ben-Gurion University of the Negev Research and Development Authority, Israel

Continuation of Ser. No. 10,469, Feb. 8, 1979, abandoned. This application Jun. 23, 1981, Ser. No. 276,265

Claims priority, application Israel, Feb. 15, 1978, 54049

Int. Cl.[4] A23C *9/12, 9/15, 9/152, 9/154*

U.S. Cl. 426—61 **13 Claims**

1. A powdered yogurt precursor composition which mixes with water to produce an acidified milk product having the texture, taste and appearance of yogurt, said composition comprising, for each liter of water with which it is to be mixed,

(a) about 10 to about 50 g of an acidogen, said acidogen being adapted to undergo spontaneous hydrolysis in aqueous medium and turning to acid gradually so as to homogeneously acidify the milk and thereby simulate the action of the baterial fermentation of lactose, while simultaneously acting as a jellyifying agent as the pH is lowered;

(b) about 90 to 240 g. of dry milk;

(c) about 2.5 to about 20 g of a mild acidic buffer, said buffer being effective to control the decreasing pH when mixed with the milk thereby preventing the milk product from turning too sour; and said buffer being further characterized in that upon mixing with said water, said buffer causes the time duration for jellying of the resulting mixture to be reduced by reducing the pH of the mixture close to the point of jellying, whereafter said acidogen need further reduce the pH only a short range of about 0.3 to about 0.9 pH units.

4,590,078

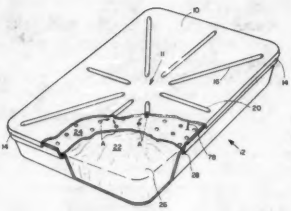
PROCESS AND APPARATUS FOR PREPARING CANNED BAKED PRODUCTS

Anthony P. Umina, 5722 Kenwick, San Antonio, Tex. 78238

Filed Jun. 9, 1983, Ser. No. 502,508

Int. Cl.[4] A21D *8/06, 10/02;* **B65D** *81/34;* **B65B** *25/22*

U.S. Cl. 426—113 **19 Claims**



1. A method of preparing baked items in rigid, large lid containers, comprising:

forming a bakery product batter wherein the water activity of the product remains below 0.95% relative humidity;

placing an amount of said batter in said large lid container, said amount being less than the volume of said container to allow for expansion of said batter during cooking;

partially sealing said lid to said container prior to baking;

heating said batter within said partially sealed container until said batter is baked;

directing steam and gases generated during baking from the central area of said container to the periphery of said container through passageways formed with said lid and preventing batter rising during said baking operation from obstructing said passageways such that steam and gas evacuation through said partially sealed container continues unobstructed even after said batter initially rises into close proximity with said lid internal to said rigid container;

cooling said cooked batter to approximately 180° F.; and hermetically sealing said container.

5. A large-size baking can for venting steam and gases during baking, comprising:

said can;

a cover extending over the area of the top of said baking can;

means located on said cover extending from the center area of said cover to the periphery for transferring steam and gases generated along said transferring means during baking to the outer periphery of said cover; and

means for preventing batter contained in said can rising during said baking operation from obstructing said steam and gas transferring means.

4,590,079

METHOD AND COMPOSITION FOR PREVENTING DISCOLORATION OF MEAT PRODUCTS

Katsuhiko Nishimori, Kitakatsuragi, and Yukihiro Nakao, Tondabayashi, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Dec. 31, 1984, Ser. No. 688,144

Claims priority, application Japan, Jan. 9, 1984, 59-2333

Int. Cl.[4] A23B *4/12, 4/14;* **A23L** *1/272*

U.S. Cl. 426—265 **9 Claims**

1. A method for preventing discoloration of meat products

which comprises incorporating into meat products (a) ascorbic acids, (b) cystine and/or cysteine and (c) aspartic acid.

4,590,080

PROCESS FOR PREPARING PARFRIED AND FROZEN POTATO PRODUCTS

Richard K. Pinegar, Caldwell, Id., assignor to J. R. Simplot Company, Boise, Id.

Continuation of Ser. No. 479,696, Mar. 28, 1983, abandoned. This application Aug. 2, 1984, Ser. No. 637,682

Int. Cl.[4] A23L *1/217*

U.S. Cl. 426—441 33 Claims

1. A process for parfrying and freezing potato strips for subsequent reconstitution, by any one of microwave oven heating, conventional oven heating, convection oven heating, and finish frying, prior to consumption, comprising the steps of:

blanching the potato strips using heated water as the blanching medium;

parfrying the potato strips a first time in hot oil;

promptly and substantially reducing the temperature level of the once-parfried potato strips by freezing the strips;

parfrying the temperature-reduced potato strips a second time in hot oil at a temperature and for a period of time such that the product of strip surface area and moisture loss from a raw state at the conclusion of said second parfrying step generally equals a predetermined constant value, said second parfrying step including placing the strips, while in a substantially frozen state, into the hot oil; and

freezing and storing the twice-parfried potato strips.

4,590,081

METHOD OF MANUFACTURING FOAMED FOODSTUFF

Takehiko Sawada, Kawasaki; Masanori Miyazawa, and Noriyuki Kikuchi, both of Yokohama, all of Japan, assignors to Ikegai Tekko Kabushiki Kaisha, Tokyo, Japan

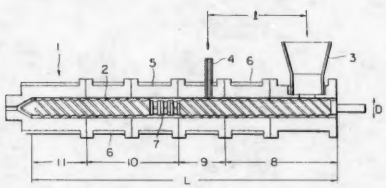
PCT No. PCT/JP84/00073, § 371 Date Oct. 26, 1984, § 102(e) Date Oct. 26, 1984, PCT Pub. No. WO84/03420, PCT Pub. Date Sep. 13, 1984

PCT Filed Mar. 1, 1984, Ser. No. 672,252

Claims priority, application Japan, Mar. 2, 1983, 58-34187

Int. Cl.[4] A23P *1/12*

U.S. Cl. 426—448 2 Claims



1. A method of continuously manufacturing a foamed foodstuff which comprises the steps of continuously introducing powdered and granular starch containing food ingredients into an extruder having a cylinder and two screws which mesh with each other and conveying said ingredients through said extruder by rotating the screws at speeds of between 100 and 300 rpms in the same direction, heating the conveyed ingredients to a temperature of 60°–100° C. in a preheating zone of the extruder thereby continuously mixing the ingredients, adding a predetermined quanity of a liquid to the mixed ingredients in a succeeding liquid-addition zone of the extruder which zone is heated to a temperature of 80°–90° C., heating the moistened ingredients to a temperature of 120°–130° C. in a succeeding kneading zone of the extruder while kneading the moistened ingredients into a slurry state, heating the said kneaded ingredients to a temperature of 150°–200° C. in a succeeding zone of the extruder to transform the starch contained in the mixture into gelatinized starch, and then extruding the ingredients from the extruder into the atmosphere wherein the extrudate is foamed to produce a foamed foodstuff.

4,590,082

FLAVORING WITH CYCLOALKYL ESTERS OF MERCAPTOALKANOIC ACIDS

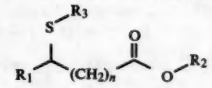
Alan O. Pittet, Atlantic Highlands; Ranya Muralidhara, Fair Haven; Manfred H. Vock, Locust; Kevin P. Miller, Middletown; Domenick Luccarelli, Jr., Neptune, and Charles Wiener, Middletown, all of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Filed Aug. 23, 1985, Ser. No. 768,706

Int. Cl.[4] A23L *1/226, 1/231, 1/235*

U.S. Cl. 426—535 17 Claims

1. A process for augmenting or enhancing the aroma or taste of a foodstuff comprising the step of adding to said foodstuff from about 0.001 ppm up to about 250 ppm of at least one cycloalkyl ester of mercaptoalkanoic acid having the structure:



wherein R_1 represents hydrogen or methyl; R_2 represents mono C_1–C_4 alkyl substituted or unsubstituted C_5–C_8 cycloalkyl; R_3 represents hydrogen or methyl; and N represents 0, 1 or 2.

4,590,083

PROCESS FOR PRODUCING RAPID-COOKING NOODLES

Satoshi Hatsugai, Fussa; Yoshiaki Kawabata, Ranzanmachi; Akira Fujiwara, Mitaka; Hisashi Kojima, Tokyo; Haruo Harada, Mitaka; Kesayoshi Kudo, Musashino, and Shinya Ohara, Kokubunji, all of Japan, assignors to Myojo Foods Co., Ltd., Tokyo, Japan

Filed Oct. 3, 1983, Ser. No. 538,266

Claims priority, application Japan, Oct. 2, 1982, 57-173575

Int. Cl.[4] A21L *1/16*

U.S. Cl. 426—557 8 Claims

1. A process for producing rapid-cooking, easily reconstitutable noodles, which comprises:

(a) adding to a wheat flour mix an ingredient, wherein said ingredient is a solid at room temperature and is selected from the group consisting of emulsifiers, oils, fats and mixtures thereof, wherein said wheat flour mix comprises wheat flour, cereal meals or starch, noodle dough conditioners, food additives, seasonings and water, and further wherein said ingredient is added in a particulate form having a mesh size of from 10 to 80 mesh in an amount of from 0.2 to 3 weight percent when said ingredient is an emulsifier and from about 0.2 to 15 weight percent when said ingredient is a fat or oil, and

(b) mixing the wheat flour mix and the ingredient to produce a dough,

(c) forming a product having a desired shape from said dough,

(d) heating said product by steam for a time sufficient to melt said ingredient in a particulate form to thereby form a plurality of holes in said product to increase the porosity of said product, and

(e) drying or frying said product.

4,590,084

RETORTED PASTE PRODUCTS CONTAINING HIGH AMYLOSE STARCH

Birgit J. Miller, Plainsboro; Harvey Bell, Martinsville, and Eugene Wojcak, Manville, all of N.J., assignors to National Starch and Chemical Corporation, Bridgewater, N.J.

Filed Feb. 8, 1984, Ser. No. 578,166
Int. Cl.[4] A21L *1/16*
U.S. Cl. 426—557 15 Claims

1. An improved retorted foodstuff selected from the group consisting of pasta and tortillas, wherein the improvement comprises an effective amount of a high amylose starch having an amylose content of at least 50% amylose, the amount being effective to improve the cooking tolerance and firmness of the foodstuff.

4,590,085

FLAVOR ENHANCEMENT AND POTENTIATION WITH BEER CONCENTRATE

Daniel R. Sidoti, Ballwin; John H. Dokos, St. Louis; Edward Katz, St. Louis, and Charles M. Moscowitz, St. Louis, all of Mo., assignors to Anheuser-Busch Incorporated, St. Louis, Mo.

Continuation-in-part of Ser. No. 474,085, Mar. 10, 1983, abandoned. This application Mar. 18, 1985, Ser. No. 713,770
Int. Cl.[4] A23L *1/221*
U.S. Cl. 426—582 7 Claims

1. A method for intensifying the flavors of prepared food products comprising adding to a food formulation foodstuffs a heat denatured concentrate of beer in an amount below the point that the concentrate is detectable in taste or mouthfeel but sufficient to achieve flavor enhancement and potentiation, the amount being in the range of about 0.2 percent to about 1.5 percent by weight of the foodstuff on a dry solids basis, said concentrate having had its beer flavor components substantially removed and its fermentative characteristics substantially retarded, the concentrate being prepared by evaporating a fermented malt beverage at a temperature of at least 135° F. until a concentrate is prepared having a solids content of at least 20 percent whereby the foodstuff can have its natural flavors accented and enhanced without the need for chemical modifiers.

4,590,086

PROCESS FOR THE PRODUCTION OF A WATER-IN-OIL-IN-WATER EMULSION FOR FOODS

Yasuyuki Takahashi, Higashimurayama; Toshiro Yoshida, Kodaira, and Takeshi Takahashi, Higashimurayama, all of Japan, assignors to Meiji Milk Products Company Limited, Tokyo, Japan

Continuation-in-part of Ser. No. 598,282, Feb. 9, 1984, abandoned. This application May 1, 1985, Ser. No. 729,192
Claims priority, application Japan, Oct. 1, 1982, 57-170954; Aug. 12, 1983, 58-146689
Int. Cl.[4] A23D *5/02*
U.S. Cl. 426—602 3 Claims

1. A process for the production of a water-in-oil-in-water (W/O/W) emulsion for foods, which comprises adding a water phase containing an emulsifier to a W/O emulsion obtained from a water phase and oil or fat containing a polyglycerol polyricinoleate, and mixing said phases under homogenization conditions effective to produce said multiple emulsion.

4,590,087

FAT HAVING BUTTER-LIKE PROPERTIES AND A REDUCED TENDENCY TO DEVELOP GRAININESS AND PROCESS FOR PRODUCING SUCH

Jacobus N. Pronk, Vlaardingen, Netherlands; Martin Soltau, and Theophil Wieske, both of Hamburg, Fed. Rep. of Germany, assignors to Lever Brothers Company, New York, N.Y.

Filed Jan. 27, 1984, Ser. No. 574,498
Claims priority, application United Kingdom, Jan. 31, 1983, 8302574; Jan. 31, 1983, 8302575; Feb. 4, 1983, 8303099
Int. Cl.[4] A23D *3/00, 5/02*
U.S. Cl. 426—603 11 Claims

1. A butter-like fat having a reduced tendency to develop graininess, which comprises:

from 16 to 46 wt.% palmitic acid residues;

from 4 to 12 wt.% stearic acid residues;

from 5 to 35 wt.% unsaturated C_{16}–C_{24} fatty acid residues in the trans configuration;

the remainder of the fatty acid residues being unsaturated C_{16}–C_{24} fatty acid residues, wherein said fat comprises:

5–15 mol.% of PUP;

5–15 mol.% of PPU;

5–20 mol.% of triglycerides from 1 saturated C_{16}–C_{24} fatty acid, 1 mono- or di-unsaturated C_{18} trans-fatty acid and 1 oleic or linoleic acid;

10–25 mol.% of triglycerides from 1 saturated $C_{16}C_{24}$ fatty acid and 2 identical or different fatty acids consisting essentially of linoleic acid or oleic acid;

2–10 mol.% of triglycerides from 2 C_{16}–C_{24} saturated fatty acids and 1 C_{18}-trans fatty acid and triglycerides from 1 C_{16}–C_{24} saturated fatty acids and 2 C_{18}-trans fatty acids;

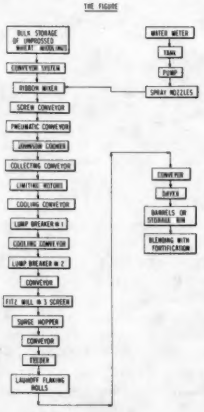
wherein PUP is a symmetric triglyceride from 2 palmit acid residues and 1 oleic acid or linoleic acid residue in cis-configuration, PPU is an asymmetric triglyceride from 2 palmitic acid residues and 1 oleic acid or linoleic acid residue in the cis-configuration, and the ratio PUP/PPU is from 0.2 to 1.6.

4,590,088

METHOD OF PREPARING INSTANT, FLAKED, WHEAT FARINA

Jan Karwowski, Franklin Lakes, N.J., assignor to Nabisco Brands, Parsippany, N.J.

Filed Oct. 16, 1984, Ser. No. 661,383
Int. Cl.[4] A23L *1/164*
U.S. Cl. 426—621 22 Claims



1. Process for preparing a dry, instant, wheat product in flake form which will readily rehydrate with hot water, comprising:

(a) impregnating wheat material, which is wheat particles in

a reduced-size state, with a sufficient amount of water to saturate the wheat material;

(b) tempering water-impregnated material (a) to produce a tempered material at uniform moisture;

(c) cooking tempered material (b) at a temperature 110° to 120° C., at a pressure of 5 to 15 p.s.i. and for 10 to 30 minutes, said cooking being sufficient to gel the starch present in the wheat material, the average particle size of material (b) being increased thereby;

(d) reducing the average particle size of cooked material (c), cooked material (c) being in particulate form;

(e) flaking cooked, particulate material (d) at a temperature of 120° F. or less to form a material in flake form; and

(f) drying flaked material (e) at a temperature of 65° to 85° c. for 5 minutes to 0.25 hour to provide a dry product in flake form, said dry flaked material (f) being non-toasted, the dry, flaked product being capable of being readily rehydrated to have the texture and flavor characteristics of cooked wheat.

4,590,089

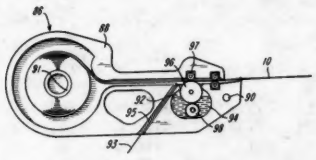
MEDICAL ELECTRODES AND DISPENSING CONDITIONER THEREFOR

James V. Cartmell, Dayton, Ohio, assignor to NDM Corporation, Dayton, Ohio

Division of Ser. No. 447,423, Dec. 6, 1982, Pat. No. 4,543,958, which is a continuation-in-part of Ser. No. 246,873, Mar. 23, 1981, which is a continuation-in-part of Ser. No. 34,394, Apr. 30, 1979, Pat. No. 4,257,424. This application Nov. 15, 1984, Ser. No. 671,825

Int. Cl.[4] A01N *1/02*

U.S. Cl. 427—2 **5 Claims**



1. The method of conditioning from storage medical electrodes each having a film thereon of a conductive adhesive equilibrated for storage with a room temperature atmosphere having a relative humidity in the range of 30%–60%, and said electrode spirally wound into a roll of said electrodes, the steps comprising placing said roll in a conditioner, moving the electrodes of said roll serially toward a discharge opening of said conditioner, exposing the conductive adhesive film of each said electrode to moisture for reducing moisture loss during storage, and discharging each of said electrodes through said discharge opening.

4,590,090

METHOD FOR MAKING INTERDIFFUSED, SUBSTANTIALLY SPHERICAL CERAMIC POWDERS

Paul A. Siemers, Clifton Park, and Casimir W. Krystyniak, Schenectady, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 28, 1982, Ser. No. 402,706

Int. Cl.[4] B05D *1/00, 1/08;* C01G *25/02*

U.S. Cl. 427—34 **2 Claims**

1. A method of forming an interdiffused oxide coating of zirconia and yttria

which comprises

providing a finely divided zirconia powder of monoclinic crystal structure,

providing a finely divided yttria powder of body centered cubic crystal structure,

dispersing the oxides in water containing less than 5% non-volatile organic binder to form a sprayable slurry,

milling the slurry to intimately intermix the oxides,

spray drying the milled slurry to form usable binder bearing particles in the desired size range of about 44 to about 74 μm,

separating the oversize and undersize particles from the usable particles,

heating the usable particles at a temperature which drives off the binder,

heating the particles at a temperature above 1400° C. for a time to form a friable mass of cubic solid solution of Y_2O_3 in ZrO_2,

pulverizing the friable mass into free flowing particles, and

plasma spraying the particles onto a receiving surface to form an interdiffused oxide coating.

4,590,091

PHOTOCHEMICAL PROCESS FOR SUBSTRATE SURFACE PREPARATION

Harvey N. Rogers, Jr., Los Angeles, and James T. Hall, Redondo Beach, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.

Filed Dec. 17, 1984, Ser. No. 682,406

Int. Cl.[4] B05D *3/06, 5/12;* C23C *13/00*

U.S. Cl. 427—53.1 **9 Claims**

1. A low-temperature, charge-free process for treating a semiconductor substrate having a native oxide layer formed on the surface thereof, comprising exposing said substrate at a temperature within the range of about 30° to 200° C. to a chosen vapor phase hydrogen-containing precursor capable of being dissociated by radiation of a predetermined wavelength in the presence of radiation of said predetermined wavelength to form neutral hydrogen species sufficient to react with said native oxide and convert said native oxide to a chemically reduced form while simultaneously avoiding thermal damage and charge damage to said substrate.

4,590,092

ALUMINIZATION PROCESS OF THE INTERNAL FACE OF THE SCREEN OF A COLOR TELEVISION TUBE

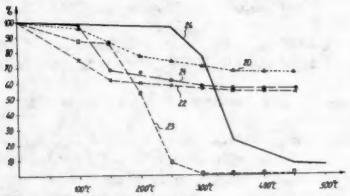
Gabriel Giancaterini, Rome, and Francisco Pacifici, Frosinone, both of Italy, assignors to Videocolor, Montrouge, France

Filed Sep. 26, 1984, Ser. No. 654,614

Claims priority, application France, Sep. 27, 1983, 83 15338

Int. Cl.[4] B05D *5/06, 5/12*

U.S. Cl. 427—68 **2 Claims**



1. Method of aluminizing the interior face of the screen of a cathode ray tube, comprising:

depositing a layer of luminescent elements on the interior face on the screen;

depositing an organic layer on the luminescent elements and on the interior face of the curved portion of the tube;

spraying a solution which includes ammonium tetraborate or hydrated ammonium tetraborate on the organic layer;

drying the sprayed solution to form therefrom microcrystals for roughing the surface of the organic layer;

depositing a layer of aluminum on the roughed surface,

apexes of the microcrystals piercing through the layer; and

heating the tube to decompose the organic layer, whereby gas resulting from the decomposed organic layer escapes through holes in the aluminum layer formed by the apexes of the microcrystals.

4,590,093

METHOD OF MANUFACTURING A PATTERN OF CONDUCTIVE MATERIAL

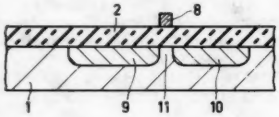
Pierre H. Woerlee, and Johannes F. C. M. Verhoeven, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 5, 1984, Ser. No. 658,108

Claims priority, application Netherlands, Oct. 10, 1983, 8303467

Int. Cl.⁴ H01L *21/02, 21/28*

U.S. Cl. 427—79 **11 Claims**



1. A method of manufacturing a pattern of conductive material, in which a substrate is covered at least in part by a silicon layer, after which the silicon layer is converted at least along a part of its edge into conductive material and the remaining part of the silicon layer is removed by means of a selective removal treatment, characterized in that the conductive material comprises a metal silicide.

3. A method as claimed in claim 1 or 2, characterized in that the silicon is converted into silicide from the edge over a distance of at least 20 nm and at most 500 nm.

6. A method as claimed in claim 3, characterized in that there is provided a number of silicon tracks which are converted along their edges into metal silicide, which forms part of a first plate of a capacitor, after which at least the metal silicide is covered by a layer of dielectric material, which is covered by a metal layer which forms part of the second plate of the capacitor.

4,590,094

INVERTED APPLY USING BUBBLE DISPENSE

Frederick C. Ringer, Jr., Essex Junction, Vt., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 29, 1984, Ser. No. 665,427

Int. Cl.⁴ B05D *5/12*

U.S. Cl. 427—82 **7 Claims**

1. An apparatus for coating photoresist on a wafer comprising:

a spindle holding the wafer with a vacuum force in an inverted position,

means for providing a predetermined deposit of photoresist in a bowl beneath said spindle sufficient to cause the photoresist to extend above the edges of the bowl and to form a convex meniscus above the surface of the bowl

said bowl having a diameter substantially smaller than the wafer,

means for causing the inverted wafer to contact the meniscus of the deposit of photoresist in said bowl, and

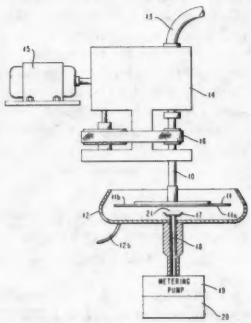
means for rotating the spindle in the inverted position in contact with said controlled amount of photoresist to spin the wafer and spread the photoresist across the spinning wafer.

2. A method of depositing photoresist on a semiconductor wafer comprising the steps of:

supporting the wafer on a rotatable means in an inverted position and providing below the inverted wafer a preselected volume of photoresist having a diameter substantially smaller than the diameter of the wafer,

moving the said inverted wafer into contact with said photoresist,

rotating said wafer in said inverted position in contact with said volume of photoresist at a selected speed to spread substantially the entire preselected volume of the photoresist across the downwardly facing side of said spinning wafer,



selectively increasing the rotational speed of the said spinning wafer above said selected speed, after said preselected volume of photoresist has been spread over the downwardly facing side of said spinning wafer, to cast off excess photoresist material and to thin out said photoresist to a selected average thickness,

terminating the rotation of said wafer after a predetermined time.

4,590,095

NICKEL COATING DIFFUSION BONDED TO METALLIZED CERAMIC BODY AND COATING METHOD

Dong-Sil Park, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jun. 3, 1985, Ser. No. 740,377

Int. Cl.⁴ H05K *3/10*

U.S. Cl. 427—96 **17 Claims**

1. A process for the nickel metallization of discrete exposed tungsten metal- or molybdenum metal-covered areas bonded to a ceramic substrate comprising the steps of:

(a) cleaning said ceramic substrate and metal-covered areas,

(b) embedding said cleaned ceramic substrate in a mixture of nickel powder, powdered activator and particulate inert filler located in a container,

(c) heating said container and its contents in an non-oxidizing environment at a temperature in the range of from about 650° C. to about 1000° C. for a period of time ranging from about 1 minutes to about 120 minutes and

(d) removing said ceramic substrate from said container, said

discrete metal-covered areas each having a coating of nickel diffusion-bonded thereto.

4,590,096

WATER VAPOR, REACTION RATE AND DEPOSITION RATE CONTROL OF TIN OXIDE FILM BY CVD ON GLASS

George H. Lindner, Vlissingen, Netherlands, assignor to M&T Chemicals Inc., Woodbridge, N.J.

Filed Dec. 28, 1984, Ser. No. 687,067
Int. Cl.[4] C03C *17/245;* B05D *5/12*
U.S. Cl. 427—109 10 Claims

1. A process for producing a coated glass having a surface resistance of less than about 40 ohms/square at a thickness less than about 250 nm, an IR reflectivity of greater than about 70%, visible transmittance of greater than about 80% and solar transmittance of greater than about 70%, comprising utilizing a chemical vapor deposition process wherein a coating solution is introduced into a carrier gas stream, said solution comprising a substantially solvent free mixture of an organotin chloride and a reactive fluorine compound soluble in or miscible with said organotin chloride, said organotin is represented by the formula

$$RSnCl_3$$

where
R is halogen or a C_1 to C_4 straight or branched chain alkyl, phenyl or $R'CH_2CH_2$—;
R′ is R″OOC or CH_3OC—;
R″ is a C_1 to C_4 alkyl;
or by the formula

$$R'''_2SnCl_2 \qquad II$$

where
R‴ is a C_1 to C_4 straight or branched chain alkyl;
or by the formula

$$R''SnCl_n(O_2R'')_{3-n}; \qquad III$$

where
R″ is a C_1 to C_4 alkyl or substituted alkyl;
n is 1 or 2;
the reactive fluorine compound is an organic compound having at least one fluorine atom located alpha or beta to a functional group, wherein the functional group is selected from the group consisting of carboxylic acid, ester, aldehyde, anhydride, nitrile, ketone, ether, amine, acid halide, alcohol, halogen, amide and hydrogen; said mixture having a vaporization temperature below about 200° C. and a decoposition temperature substantially above the vaporization temperature of the mixture and below about 650° C.; and the gas stream contains sufficient water vapor such that the relative humidity of the gas stream at 18° C. is about 6% to about 100%.

4,590,097

METHOD OF COATING DUAL PROTECTIVE LAYERS

Roger G. Booth, 9, Preston Close, Church Hill, Redditch, Worcestershire, and Donald L. Bartlett, The Chestnuts, Old Church Rd., Water Orton, Birmingham, both of United Kingdom

Filed Dec. 14, 1984, Ser. No. 681,919
Claims priority, application United Kingdom, Dec. 16, 1983, 8333542
Int. Cl.[4] B05D *3/02*
U.S. Cl. 427—154 6 Claims

1. A process for providing a substrate with a strippable polyurethane coating (1) derived from a hydroxy-functional polyester and a polyisocyanate, characterized in that a barrier coating (2) comprising:
(a) a film-forming addition polymer comprising units of a vinyl aromatic monomer and units of a monomer containing a hydroxy alkyl group in an amount sufficient to provide a hydroxyl content for the addition polymer in the range 0.5 to 5 percent by weight and
(b) a polyisocyanate containing at least two isocyanate groups per molecule
is applied to the substrate at a ratio of isocyanate groups in (b) to hydroxyl groups in (a) of 1:1 to 2:1 before the polyurethane coating (1) so that the polyurethane coating (1) can be removed from the substrate by a stripping solvent without removing the barrier coating (2).

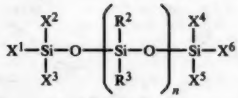
4,590,098

PROCESS FOR PRODUCING COMPOSITE MEMBRANE

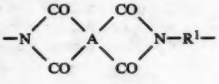
Yoshitaka Kazuse; Akio Iwama, and Shinichi Chikura, all of Osaka, Japan, assignors to Nitto Electric Industrial Co., Ltd., Osaka, Japan

Filed Oct. 23, 1984, Ser. No. 663,748
Claims priority, application Japan, Oct. 27, 1983, 58-202450
Int. Cl.[4] B05D *5/00*
U.S. Cl. 427—244 11 Claims

1. A process for producing a composite membrane which comprises:
bringing an organic solution of a cross-linkable silicone resin represented by the formula:



wherein X^1, X^2, X^3, X^4, X^5 and X^6 each is a monovalent organic group, with the proviso that at least three groups thereof present at both ends of the molecule each is a reactive group selected from the group consisting of an acyloxy group, an alkoxy group, a ketoxime group, an alkyl-substituted amino group and an amide group, R^2 and R^3 each is an organic group selected from the group consisting of an alkyl group, a halogenated alkyl group, a vinyl group and an aryl group, and n is an integer of from 400 to 1,000, into contact with the surface of a dense layer of an anisotropic membrane made of a polyimide resin comprising a dense surface layer and a porous layer continuously connected to the dense surface layer, said polyimide resin consisting essentially of a repeating unit represented by the formula:

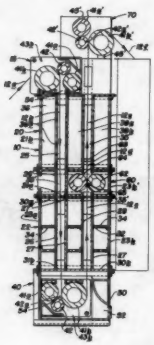


wherein A is a tetravalent aliphatic or aromatic group, and R^1 is a divalent aromatic, alicyclic or aliphatic hydrocarbon group, or a divalent organic group comprising the hydrocarbon groups linked together through a divalent organic linking group, and
cross-linking the silicon resin to form a cross-linked silicone resin thin film on the dense surface layer of the anisotropic membrane, wherein the average molecular weight of the cross-linkable silicone resin is equivalent to or greater than the molecular cut-off of the polyimide resin anisotropic membrane and wherein the cross-linkable silicone resin is cross-linkable at room temperature.

4,590,099
FIBROUS WEB SATURATOR

Richard A. Reith, Memphis, Tenn., assignor to R & R Research & Development, Inc., Memphis, Tenn.

Filed Oct. 12, 1984, Ser. No. 660,026
Int. Cl.[4] B05D 3/00, 3/12; B05C 3/12, 11/115
U.S. Cl. 427—296 5 Claims



1. Apparatus to saturate a fibrous web with coating material comprising: a chamber having an inlet and an outlet; seal means adjacent each of said inlet and outlet, said seal means being adapted to permit passage of a web into and out of the chamber; a second seal means in said chamber dividing the chamber into a preparation zone and a treatment zone, the improvement comprising: means associated with said preparation zone for evacuating air from the open area between the fibers in the web; means in said treatment zone for containing pressurized liquid; pressure control means to maintain pressure in the treatment zone greater than atmospheric pressure; means in said treatment zone forming a nip; and means for submerging said nip in said pressurized liquid in said treatment zone to compress said web to squeeze liquid and residual air from the open area between the fibers in the web adjacent the entrance into the nip, thereby causing liquid to be drawn into the open areas between the fibers in the web upon exiting said nip.

5. A method of saturating a fibrous web with coating material comprising the steps of: squeezing a web between a pair of rollers adjacent an entrance into a vacuum chamber; subjecting the web which has been squeezed between the pair of rollers to a partial vacuum in the vacuum chamber to draw air from the open area between the fibers in the web; squeezing the web between a second pair of rollers to form a seal to maintain the partial vacuum in the vacuum chamber; moving the web from the vacuum chamber through a reservoir of pressurized liquid to cause liquid to be drawn into the open area between the fibers in the web; and moving the web between a third pair of rollers submerged in the pressurized liquid to squeeze liquid and residual air from the open area between the fibers in the web to condition the web to become saturated with liquid in which the third pair of rollers is submerged.

4,590,100
PASSIVATION OF STEEL WITH AQUEOUS AMINE SOLUTIONS PREPARATORY TO APPLICATION OF NON-AQUEOUS PROTECTIVE COATINGS

Peter J. Hearst, Oxnard, Calif., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Continuation-in-part of Ser. No. 546,252, Oct. 28, 1983, abandoned. This application May 3, 1985, Ser. No. 729,849
Int. Cl.[4] B05D 3/10; B08B 30/00
U.S. Cl. 427—327 30 Claims

30. A method for the treatment and passivation of steel surfaces exposed to the atmosphere to prevent flash rusting during the cleaning and subsequent coating thereof with a non-aqueous protective coating, comprising the steps of:

a. initially preparing the steel surfaces to be treated by cleaning and removing grease, paint scale, rust and the like down to bare metal;

b. treating the prepared bare metal surfaces with a concentrated non-toxic and neutralizing aqueous first rinse solution containing only volatile water-soluble amine, said water-soluble amine in solution having a boiling point higher than that of water to rinse out and neutralize any acid and other cleaning ingredients remaining on the steel surfaces from the initial preparation thereof; said first rinse solution containing essentially no other ingredients that may leave residues on the steel surfaces detrimental to the optimum adherance and performance of the subsequently applied non-aqueous protective coating;

c. subsequently treating the steel surfaces with a dilue non-toxic aqueous passivating second rinse solution containing only a volatile water-soluble amine, having a boiling point higher than that of water, to ensure that the steel surfaces are essentially free of residue and that any moisture remaining on the steel surfaces is in a slightly alkaline condition to prevent flash rusting; said second rinse solution containing essentially no other ingredients that may leave residues on the steel surfaces detrimental to the adherance and performance of the subsequently applied non-aqueous protective coating;

d. drying said steel surfaces to first evaporate and remove all water leaving a thin layer of only moist amine and then continuing the drying process to evaporate essentially all of the volatile water-soluble amine to leave the surfaces clean, thoroughly dry, free of non-volatile and undesirable residues, and ready for subsequent application of suitable non-aqueous protective coatings; said steel surfaces remaining slightly alkaline until all moisture and amine have been removed;

e. subsequently applying a suitable non-aqueous protective coating to said prepared steel surfaces; any minimal residue of an amine remaining on the cleaned steel surfaces after drying being incorporated into the subsequently applied non-aqueous protective coatings without leaving any water-soluble or ionic residues on the surfaces of the steel so as not to affect the adhesion and performance of the protective coatings.

4,590,101
SURFACE COATING PROCESS

Jerome W. Knapczyk, Wilbraham, Mass., assignor to Monsanto Company, St. Louis, Mo.

Filed Jul. 19, 1985, Ser. No. 757,037
Int. Cl.[4] B05D 3/02, 3/12
U.S. Cl. 427—350 10 Claims

1. A process for coating a substrate with a film of cured polymer which comprises:

A. admixing a first component comprising poly(α, β-ethylenically unsaturated) oligomer with a second component comprising a polyallyloxy activator compound and an effective amount of a free radical polymerization initiator;

B. adding an effective amount of metal drier catalyst to the admixture;

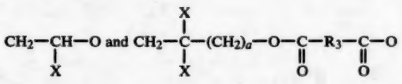
C. applying a film of the admixture to the substrate in an air or oxygen-rich atmosphere; and

D. placing the substrate in an atmosphere substantially free of oxygen for a sufficient time to allow the film to cure to a tack-free condition; wherein the polyallyloxy activator compound is selected from the group represented by the formulae

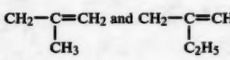
$$R_1—(E)_mR_2]_n,\ R_4(OY)_p \text{ and } R_5[CH(OY)_2]_q$$

where R_1 is a radical of molecular weight less than about 2000 obtained by removal of active hydrogen from an

active hydrogen compound selected from the group consisting of water, alcohols, thiols, carboxylic acids, carboxylic amides and amines, where the functionality of R_1 is n and is in the range of 1 to 10, where E is a divalent radical selected from the group represented by the formulae



where X is selected from the group consisting of H, CH_3, C_2H_5 and CH_2OY, Y being selected from the group consisting of CH_2—CH=CH_2,



where a is 0 or 1, where R_2 is hydrogen or an unsubstituted or substituted C_1 to C_{10} hydrocarbyl radical, where R_3 is a divalent unsubstituted or substituted C_2 to C_{10} hydrocarbyl radical and where the product of m and n is at least 4 and not more than about 60; where R_4 is a C_4 to C_{12} aliphatic hydrocarbyl or oxahydrocarbyl radical of equivalence p in the range of 4 to 12; where R_5 is absent or is a C_1 to C_{10} unsubstituted or substituted hydrocarbyl group and q is in the range of 2 to about 30; wherein the weight ratio of poly(α, β-ethylenically unsaturated) oligomer to polyallyloxy activator compound is in the range of about 30:70 to about 99:1; and wherein the polyallyloxy activator contains from 4 to 60 allyloxy groups per molecule.

4,590,102

LOW TEMPERATURE CURING OF NONWOVEN PRODUCTS BONDED WITH N-METHYLOLACRYLAMIDE-CONTAINING COPOLYMERS

Peter L. Rosamilia, Waretown, N.J., and George Davidowich, Allentown, Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.

Filed Jan. 7, 1985, Ser. No. 689,201

Int. Cl.[4] D02G *3/00*; B05D *3/02*

U.S. Cl. 427—374.1 **20 Claims**

1. In a method for preparing a nonwoven product bonded with an N-methylolacrylamide-containing copolymer resin which comprises applying the aqueous resin emulsion containing an acidic curing agent to a nonwoven web of fibers and drying and curing the nonwoven web at elevated temperatures to drive off water and to effect cross-linking of the N-methylolacrylamide-containing resin, the improvement which comprises

(a) adding to a vinyl acetate/ethylene/N-methylolacrylamide or a vinyl chloride/ethylene/N-methylolacrylamide copolymer emulsion a curingly effective amount of an acidic curing agent having a pK_a ranging from about 1 to 2 and applying to a nonwoven web,

(b) heating the treated nonwoven web for a time and at a temperature sufficient to volatilize a substantial amount of the water but insufficient to effect substantial crosslinking of the resin and

(c) maintaining the copolymer on the dried nonwoven web at a temperature which is less than the temperature of step (b) and for a time sufficient to develop essentially full cure.

4,590,103

METHOD FOR THE PREPARATION OF THIN POLYIMIDE FILM

Hellmut Ahne, Röttenbach; Wolfgang Kleeberg, Erlangen; Roland Rubner, Röttenbach, and Hans Krüger, Munich, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany

Continuation of Ser. No. 537,685, Sep. 30, 1983, abandoned, which is a continuation of Ser. No. 350,769, Feb. 22, 1982, abandoned. This application Jun. 20, 1984, Ser. No. 622,387

Claims priority, application Fed. Rep. of Germany, Feb. 27, 1981, 3107633

Int. Cl.[4] B05D *3/02*

U.S. Cl. 427—387 **3 Claims**

1. In a method for preparing polyimide layers having a thickness of less than about 0.2 μm, wherein a solution of a polyimide prepolymer is applied to a substrate in the form of a film and the applied film is thereafter annealed to convert the prepolymer to polyimide, the improvement wherein said prepolymer is a film-forming prepolymer of a highly heat-resistant polyimide, said solution of said prepolymer also contains a compound selected from a diazoquinone, an oligomeric ester or ether having an aliphatic or cycloaliphatic structural element, polymethylmethacrylate or a polyolefin sulfone, which compound is volatilized in the annealing process, and, during annealing, said solution gives off a percentage of volatile products, relative to its total weight, which is sufficiently large to result in a reduction in the thickness of the applied film of at least about 40%.

4,590,104

PRODUCTION OF FIBER-REINFORCED MATERIALS

Hartmut Zeiner, Plankstadt; Jürgen Fischer, Ludwigshafen; Gerhard Heinz, Weisenheim; Peter Neumann, Wiesloch; Dietmar Nissen, and Gerhard Schaefer, both of Heidelberg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Feb. 14, 1985, Ser. No. 701,535

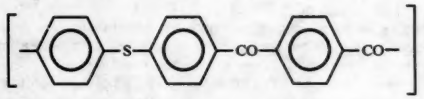
Claims priority, application Fed. Rep. of Germany, Feb. 16, 1984, 3405523

Int. Cl.[4] B05D *3/02*

U.S. Cl. 427—389.9 **3 Claims**

1. A process for the production of fiber-reinforced materials comprising the following steps in sequence:

(a) impregnating continuous filaments or fibrous structures with a low-viscosity melt of a low-molecular weight polyarylene sulfide ketone characterized by repeating units of the formula



(b) shaping the resulting semi-finished product to give a finished article, and then

(c) heating the finished article for a period of not less than 15 minutes at a temperature above the crystallite melting point of the polyarylene sulfide ketone to effect a cross-linking thereof.

4,590,105

ARTIFICIAL TREE AND METHOD OF MAKING THE SAME

Earl R. Shaffer, Muncy, Pa., assignor to Herman Rynveld's Son Corporation, Muncy, Pa.

Filed Nov. 2, 1984, Ser. No. 667,585

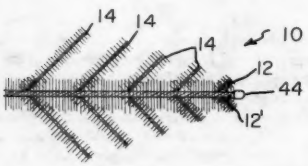
Int. Cl.[4] A47G *33/06*

U.S. Cl. 428—8 **3 Claims**

1. In a member for an artificial tree comprising a limb with

a plurality of branches attached to said limb, each of said branches being formed from a pair of wires and a plurality of thin brush stock filaments by placing said filaments across one of said wires transversely thereof, placing said second wire on the first and over said filaments, and then twisting said wires with said filaments interposed between said twisted wires along the length of said twisted wires, said limb having been made from a pair of wires of heavier gauge than said branch wires, the improvement comprising:

said limb being formed from said heavier-gauge wires, a plurality of said branches, and a plurality of thin brush



stock filaments, by placing said filaments in close proximity to each other in a layer on a first one of said heavier-gauge wires with said filaments being disposed transversely of said first wire, placing a plurality of said branches on said first heavier-gauge wire in spaced relation to each other and transversely of said first wire, then placing said second heavier-gauge wire on said first heavier-gauge wire over said filaments and over said branches, then twisting said heavier-gauge wires together with said filaments and said branches captured between said heavier-gauge wires.

4,590,106

HEAT RESISTANT HEAT SHRINKABLE FILMS

Joseph C. Hsu; Donald W. Vought, both of Neenah, and George H. Walbrun, Menasha, all of Wis., assignors to American Can Company, Greenwich, Conn.

Division of Ser. No. 538,558, Nov. 10, 1983, Pat. No. 4,541,983, which is a division of Ser. No. 308,950, Mar. 17, 1985, Pat. No. 4,501,779. This application Mar. 7, 1985, Ser. No. 709,099

The portion of the term of this patent subsequent to Feb. 26, 2002, has been disclaimed.

Int. Cl.[4] B65D *11/00*; B32B *7/02*

U.S. Cl. 428—35 **10 Claims**

1. A heat shrinkable oriented three layer film, wherein said film comprises a first heat sealable layer of ionomer having two surfaces, a second layer of a vinylidene chloride copolymer having two surfaces, and having one of said surfaces on said second layer on one said surface of said first layer, and a third outer layer on the other said surface of said second layer, the composition of said third layer being a blend of an ionomer and an ethylene vinyl acetate copolymer, the ethylene copolymer content of said blend being no greater than 20% by weight, the vinyl acetate content of said ethylene vinyl acetate copolymer being at least 22%, and the vinyl acetate content of said blend being at least 4.5% by weight, said film having been made by the process of:

(a) coextruding a three layer tubular tape having a first inner layer of an ionomer, a second layer of a vinylidene chloride copolymer, and a third layer of a blend of an ionomer and an ethylene vinyl acetate copolymer, wherein the ethylene vinyl acetate copolymer content of said blend is no greater than 20% by weight, the vinyl acetate content of said ethylene vinyl acetate is at least 22%, and the vinyl acetate content of said blend is at least 4.5% by weight;

(b) cooling said tape below the crystalline melting temperatures of each of the three layers;

(c) reheating said tape to a temperature of about 195° to 205° F.; and

(d) orienting said tape to form a film by blowing a bubble in the reheated tape and providing an appropriate draw to the film to provide an oriented film having normally balanced shrink properties, the free shrink of said film at 160° F. being about 20% to 26% and at 180° F. being about 42% to 45%, the shrink force of said film at 160° F. being about 160 to 219 grams per inch and at 180° F. being about 160 to 188 grams per inch.

4,590,107

THIN-WALLED, LOW PLASTICIZED CONTENT REGENERATED CELLULOSE SAUSAGE CASING

Douglas J. Bridgeford, Champaign, Ill., assignor to Teepak, Inc., Oak Brook, Ill.

Continuation of Ser. No. 232,090, Feb. 6, 1981. This application Feb. 11, 1985, Ser. No. 698,860

Int. Cl.[4] A22C *13/00*

U.S. Cl. 428—36 **11 Claims**

1. An artificial sausage casing of regenerated cellulose adapted to be shirred and stuffed with meat, produced by annularly extruding viscose into a tubular product having a dried wall thickness of less than about 0.90 mils, regenerating and coagulating the tubular product for sufficient time and conditions to retard the rate of viscose regeneration to coagulation to form a casing product, wherein the casing has a wall thickness less than about 0.90 mils and has a skin cross-sectional area wall structure in which the skin comprises at least 20% of the cross-sectional area of the casing wall, said casing having a plasticizer content of less than 14% based on the weight of the casing.

8. In the method for producing tubular sausage castings of regenerated cellulose wherein viscose is annularly extruded to form a tubular product and the tubular product is coagulated and regenerated to form gel tubing in a coagulation/regeneration bath and the gel tubing dried to form the casing product, the improvement comprising extruding the tubing to a dry wall casing thickness of less than about 0.90 mils, retarding the rate of regeneration relative to coagulation by maintaining the first coagulation/regeneration bath at a concentration comprising from about 200 to about 300 g/l sodium sulfate and about 90 to about 130 g/l sulfuric acid and a temperature from about 22° to about 38° C., until a dried, thin walled small diameter shirrable casing product having a skin content comprising at least 20% of the cross-sectional area of the casing wall is formed and having a plasticizer content of less than about 14% based on the weight of the casing.

4,590,108

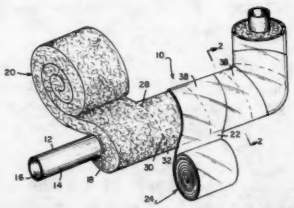
METHOD AND SYSTEM FOR INSULATING PIPES

Reynold B. Nippe, 6 William Fairfield Dr., Wenham, Mass. 01984

Filed Jul. 11, 1984, Ser. No. 629,624

Int. Cl.[4] F16L *9/14*

U.S. Cl. 428—36 **4 Claims**



1. An insulating system for a tubular conduit for various fluids, said tubular conduit having an outer surface, the insulating system comprising;

an inner layer of compressible resilient thermal barrier material wrapped about the outer surface of said conduit;

an outer layer of fluid barrier cohesive material wrapped about said inner layer of thermal barrier material and having lateral edge portions in overlapped contact with one another; and

a cohesive seal coextensive in length with said outer layer of fluid barrier material and being formed between said contacting overlapped edge portions of said outer layer, said edge portions being coherent to one another to form a cohesive seal therebetween, said outer layer being wrapped so as to partially compress both circumferentially and radially said resisient inner insulating layer whereby the resiliency of said inner layer cooperates to maximize said cohesive seal by pressing said contacting edges against one another thereby holding said thermal insulation system about said conduit;

said inner thermal barrier material being formed of a strip of said thermal barrier material having lateral edges and being helically wrapped so that adjacent edges abut to form a seam defined by said abutting edges; and said outer layer of cohesive material being wrapped about said thermal barrier material to minimize coincidence of said cohesive seal with said seam.

4,590,109

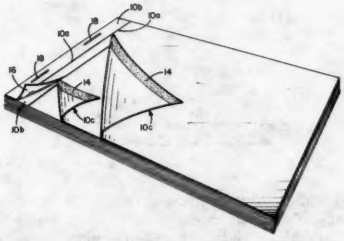
PAD OF PAPER SHEETS WITH PRESSURE-SENSITIVE ATTACHMENT EDGE PORTION AND METHOD OF MAKING THE SAME

Thomas A. Holmberg, Richfield, Minn., assignor to The Holmberg Company, Minneapolis, Minn.

Filed Mar. 20, 1985, Ser. No. 713,811

Int. Cl.[4] B32B *3/02, 29/00*

U.S. Cl. 428—40 **3 Claims**



1. The method of manufacturing a pad of connected paper sheets including a plurality of sheets, each having a recess formed along one marginal edge portion thereof,

applying a reusable layer of pressure-sensitive adhesive in the recess,

covering the pressure-sensitive adhesive layer with an attachment strip, the combined thickness of the adhesive and the attachment strip being no greater than the depth of the recess,

forming a separation slit in each sheet through overlying relation to the adhesive layer and the attachment strip but of insufficient depth to sever the attachment strip, to thus divide the sheet into two segments, an attachment segment and a removable segment, and

connecting the attachment portions and the respective attachment strips together to form a pad of a plurality of said sheet assemblies.

2. A paper sheet comprising,

an attachment marginal edge portion,

a recess formed along said attachment edge portion having a predetermined depth,

a layer of non-drying, pressure-sensitive adhesive applied only in the recessed marginal edge portion,

a protective strip removably applied to the layer of adhesive in said recess,

the combined thickness of the adhesive and protective strip being no greater than the depth of the recess so that the thickness of the attachment marginal edge portion of the paper sheet is no thicker than the remaining portion of the sheet to permit processing of the sheet through a conventional processing operation such as printing and copying in a conventional manner, and

a separation slit through the paper sheet in overlying relation to an intermediate portion of said protective strip to divide the paper sheet into an attachment segment and a separate removable segment connected only by the protective strip.

4,590,110

GRID CONSTRUCTION FOR RUNNER OR DOORMAT

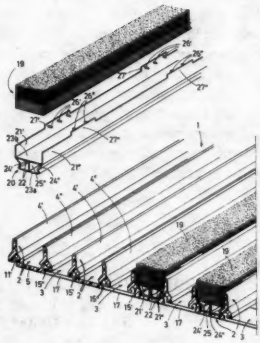
Erich Arens, Albertstrasse 11, 5900 Siegen, Fed. Rep. of Germany

Filed May 14, 1984, Ser. No. 610,242

Claims priority, application Fed. Rep. of Germany, May 13, 1983, 3317410

Int. Cl.[4] B32B *3/00*

U.S. Cl. 428—53 **20 Claims**



1. A grid for a mat to be walked upon, comprising:

a multiplicity of mutually parallel and equispaced horizontal bars of elastic material having a generally U-shaped cross-section with pairs of upstanding flanges defining between them a set of first upwardly open longitudinal channels, confronting flanges of ajoining bars defining between them a set of second upwardly open longitudinal channels, the flanges of each bar being interconnected by a web having an upper surface, each bar being formed with at least one groove of significantly smaller cross-sectional area than said channels, said groove being undercut above a downwardly open entrance slot extending upwardly from substantially the level of the upper suface of said web;

a multiplicity of rails of generally U-shaped cross-section complementary to that of the channels of at least one of said sets, said rails respectively occupying the complementarily cross-sectioned channels;

a multiplicity of tread strips respectively received in said rails and projecting therefrom above the upper edges of said flanges; and

elongated U-section connectors extending the full lengths of said bars and interlinking said bars and forming bottoms of said second channels extending all along said second channels, said connectors being provided with upstanding ribs respectively extending from below into the grooves of said bars continuously over the lengths thereof and terminating in broadened coupling heads fitted into the under-

cuts of said grooves, said complementarily cross-sectioned channels having undercuts substantially at the level of the undercuts of said grooves.

4,590,111

FRAGRANCE RELEASING SHEET ARTICLE AND METHOD OF MAKING SAME

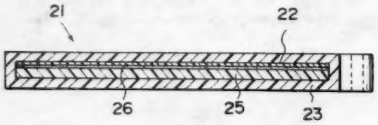
Keinosuke Takeuchi, Kadoma, Japan, assignor to Hakugen, Ltd., Tokyo, Japan

Filed Oct. 17, 1983, Ser. No. 542,341

Claims priority, application Japan, Oct. 21, 1982, 159788[U]; Oct. 21, 1982, 57-185846

Int. Cl.[4] B44C 1/26

U.S. Cl. 428—67 10 Claims



1. A fragrance releasing sheet article comprising a pattern member with colorless and colored patterns thereon which is formed of a thermoplastic or thermosetting resin and a fragrance releasing member composed of a transparent or semi-transparent thermoplastic or thermosetting resin and perfume, said fragrance releasing member and said pattern member being integrally constituted said fragrance releasing member adhering to said pattern member, the pattern member being in the interior and the fragrance releasing member being in the exterior of said sheet article.

4,590,112

MULTI-LAYER ADHESIVE ARTICLES

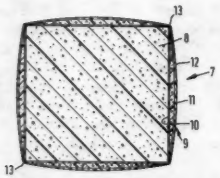
Anthony E. C. Plumridge, and Gillian M. Plumridge, both of 9 Sion Hill Place, Bath, Avon, BA1 5SJ, United Kingdom

Filed Jan. 30, 1985, Ser. No. 696,447

Claims priority, application United Kingdom, Feb. 1, 1984, 8402589; Oct. 2, 1984, 8424784

Int. Cl.[4] B32B 1/00, 5/18, 27/30

U.S. Cl. 428—71 20 Claims



1. An article, which is suitable to adhere to a smooth, high gloss surface, comprising:

a lower layer formed from a polished, highly plasticized polyvinyl chloride material and intended to adhere to the said surface;

an intermediate layer formed of a padding material to give the article a padded appearance; and

an upper layer of a polyvinyl chloride material;

the upper and lower layers being secured together at least along their peripheral edge regions to enclose the intermediate layer therebetween.

4,590,113

FIBER WOOL PADDING, AND METHOD OF MANUFACTURING SAME

Heinz Herzog, Lahr, Fed. Rep. of Germany, assignor to Oscar Weil GmbH & Co. KG, Lahr, Fed. Rep. of Germany

PCT No. PCT/EP82/00096, § 371 Date Jan. 10, 1983, § 102(e) Date Jan. 10, 1983

PCT Filed May 7, 1982, Ser. No. 459,881

Claims priority, application Fed. Rep. of Germany, May 8, 1981, 3118343

Int. Cl.[4] B32B 3/02

U.S. Cl. 428—92 8 Claims

1. A composite material comprising: a support having a first surface and a second surface opposite the first surface, a plurality of cross-shaped perforations in said support and extending through said support from said first surface to said second surface so as to form flaps in said support at each perforation; and a web of non-woven fibers of considerable length, said web being located on said first surface and having fiber loops extending from the first surface respectively through said perforations and beyond the second surface, said loops engaging the flaps on the second surface.

4,590,114

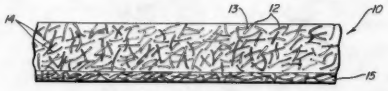
STABILIZED ABSORBENT STRUCTURE CONTAINING THERMOPLASTIC FIBERS

Dennis C. Holtman, Flemington, N.J., assignor to Personal Products Company, Milltown, N.J.

Filed Apr. 18, 1984, Ser. No. 601,754

Int. Cl.[4] B32B 5/14

U.S. Cl. 428—171 21 Claims



1. A stabilized batt comprising: a batt of non-delignified wood pulp fibers, said fibers providing a plurality of fiber intersections throughout said batt; and a minor proportion of at least about five percent (5%) of bonding fibers consisting of thermoplastic fibers substantially evenly distributed throughout said batt and having been rendered tacky by heat to provide bond sites throughout the thickness of said batt, at least some of said bond sites being present at said fiber intersections to retain said non-delignified wood pulp fibers in a fiber network to thereby stabilize said batt.

4,590,115

METALLIZING OF PLASTIC SUBSTRATA

Robert Cassat, Ternay, France, assignor to Rhone-Poulenc Specialites Chimiques, Courbevoie, France

Filed Dec. 13, 1982, Ser. No. 449,183

Claims priority, application France, Dec. 14, 1981, 81 23472

Int. Cl.[4] C25D 5/56

U.S. Cl. 428—174 16 Claims

1. A process for metallization of a plastic substrate including

(i) providing a plastic shaped article comprising intimate admixture of a polymeric resin and a plurality of small filler particles of cuprous oxide uniformly dispersed therethrough,

(ii) subjecting at least one of the face surfaces of said plastic shaped article to the action of a reducing agent comprising

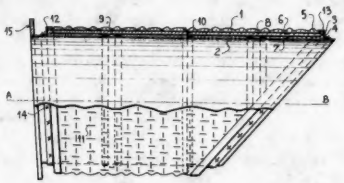
a borohydride to convert the cuprous oxide filler particles to conductive free metal, the metallization growth nuclei thereby obtained having a surface resistivity ranging from about 0.01 Ω/□ to about 10^3 Ω/□ and thence electrolessly and/or electrolytically metallizing the at least one reduced face surface of said plastic shaped article with a free metal deposit.

16. The product of the process as defined by claim 1.

4,590,116
PIECE WITH INTEGRATED HEAT-INSULATING COVERING

Claude Joly, Puteaux, France, assignor to Bronzavia, Courbevoie, France

Filed Feb. 6, 1984, Ser. No. 577,221
Claims priority, application France, Feb. 8, 1983, 83 01958
Int. Cl.[4] B32B *1/08*; F16L *59/14*
U.S. Cl. 428—182 **32 Claims**



1. A heat insulated piece comprising:

(a) an inner wall having an inner surface and an outer surface;

(b) a plurality of layers of a solid, non-fluent heat insulating material, each of said plurality of layers having an inner surface and an outer surface, the inner surface of the innermost one of said plurality of layers of heat insulating material facing the outer surface of said inner wall, said plurality of layers of heat insulating material being separated by reflecting screens;

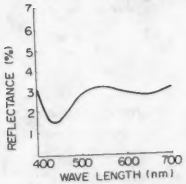
(c) an outer wall having an inner surface and an outer surface, said outer wall being formed from a metal sheet, the inner surface of said outer wall facing the outer surface of the outermost one of said plurality of layers of heat insulating material; and

(d) a plurality of first stiffeners fixed both to said inner wall and to said outer wall and extending therebetween so that said inner and outer walls reinforce each other.

4,590,117
TRANSPARENT MATERIAL HAVING ANTIREFLECTIVE COATING

Takashi Taniguchi, Shiga, and Jiro Mibae, Otsu, both of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Continuation of Ser. No. 474,741, Mar. 10, 1983. This application Apr. 15, 1985, Ser. No. 722,760
Int. Cl.[4] G02B *1/10*; B32B *7/02*
U.S. Cl. 428—212 **15 Claims**



1. A transparent material having an antireflective coating, at least one surface of which has a haze value of not more than 80%, the antireflective coating comprising at least two layers each cured on at least a part of the surface of a transparent substrate, said layers comprising an inner layer containing a compound of a metal selected from the group consisting of Ti, Al and Zr, and an outer layer containing an organic silicon compound, wherein the thickness and the refractive index of the layer contiguous to the substrate and the thickness and the refractive index of the outermost layer satisfy the following requirements:

$$\frac{l}{4}\lambda \times 0.7 < n_I d_I < \frac{l}{4}\lambda \times 1.3,$$

and

$$\frac{m}{4}\lambda \times 0.7 < n_O d_O < \frac{m}{4}\lambda \times 1.3,$$

wherein n_I represents the refractive index of the layer contiguous to the substrate, n_O represents the refractive index of the outermost layer, d_I represents the film thickness (in nm) of the layer contiguous to the substrate, d_O represents the film thickness (in nm) of the outermost layer, l is a positive integer, m is an odd positive integer, and λ stands for an optional standard wavelength (in nm) selected within the visible ray wavelength region or in the vicinity thereof, and $n_I > n_O$ and $n_I > n_S$

wherein n_S represents the refractive index of the substrate, the composition for forming the cured layer continguous to the substrate comprising at least 10% by weight as the metal oxide equivalent weight, based on the weight of the layer-forming coating components, of at least one member selected from the group consisting of alkoxides and acylates of titanium, aluminum and zirconium having 1 to 12 carbon atoms, chelate compounds of said metals and dispersed phases in liquid of oxides of said metals, and not more than 90% by weight, based on the weight of the layer-forming coated components, of a material selected from the group consisting of organic resins and inorganic fine particles; and the composition for forming the cured outermost layer comprising at least 20% by weight as the solid content equivalent weight based on the weight of the layer-forming coating components, of at least one compound selected from the group consisting of an organic silicon compound represented by the following general formula:

$$R^1_a R^2_b Si(OR)_{4-a-b}$$

wherein R^1 and R^2 independently stand for a hydrocarbon group having 1 to 10 carbon atoms, containing an alkyl, alkenyl, aryl, halogeno, epoxy, amino, mercapto, methacryloxy or cyano group, R stands for an alkyl, alkoxyalkyl or acyl group having 1 to 8 carbon atoms, a and b are 0 or 1, and the sum of a and b is 1 or 2, and a hydrolyzed product of said organic silicon compound and not more than 80% by weight, based on the weight of the layer-forming coating components, of a material selected from the group consisting of organic resins and inorganic fine particles.

4,590,118
SELECTIVE LIGHT TRANSMISSION SHEET

Toshiaki Yatabe; Nobuo Suzuki, and Yoshio Itakura, all of Tokyo, Japan, assignors to Teijin Limited, Osaka, Japan

Filed Feb. 16, 1984, Ser. No. 581,001
Claims priority, application Japan, Feb. 17, 1983, 58-23842; Dec. 15, 1983, 58-235157
Int. Cl.[4] B32B *27/18, 15/08*
U.S. Cl. 428—215 **11 Claims**

1. A selective light transmission sheet having a selective light transmission laminate structure whose laminate structure comprises:

a first selectively light transmitting structure comprising:

(a) at least one metal layer formed of a metal selected from the group consisting of gold, silver, copper and their alloys, having a thickness ranging from 40 Å to 300 Å, and

(b) at least one dielectric layer having a refractive index of

1.35 to 2.5 and having a thickness ranging from 30 Å to 1,500 Å, and

a second selectively light transmitting structure comprising an organic polymer layer which contains a near infrared ray absorbent whose maximum absorption wave length is in the range of 800 nm to 1,200 nm, wherein said second selectively light transmitting structure has a transmission factor of 30% or less at the maximum absorption wavelength and, a visible light transmission factor of 50% or more, wherein said selective light transmission sheet has a visible light transmission factor of 50 to 80%.

4,590,119

POLYESTER FILM AND MAGNETIC RECORDING MEDIUM THEREFROM

Ken-ichi Kawakami; Toshiya Yoshii, both of Otsu; Masaru Suzuki, Ito, and Hotsuma Okasaka, Mishima, all of Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Jun. 20, 1984, Ser. No. 622,771

Claims priority, application Japan, Jul. 15, 1983, 58-128004; Sep. 29, 1983, 58-181246; Oct. 14, 1983, 58-190969

Int. Cl.⁴ G11B 5/64, 5/66

U.S. Cl. 428—216 **29 Claims**

1. A magnetic recording medium comprising:

(1) an oriented polyester film containing, per 100 parts by weight of a polyester,

(A) 0.005–1 part by weight of fine particles having an average size of 0.05–3 μm, and

(B) 0.005–0.5 parts by weight of at least one compound selected from the group consisting of higher aliphatic monocarboxylic acids having 10–33 carbon atoms and esters thereof; and

(2) a magnetic layer laminated on at least one side of the oriented polyester film.

4,590,120

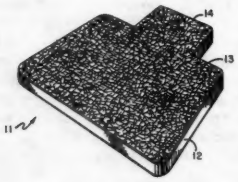
TRANSPARENT STATIC REDUCING MAT

William G. Klein, 2026 Bay Rd., Stoughton, Mass. 02072

Filed Jan. 16, 1985, Ser. No. 691,855

Int. Cl.⁴ B32B 7/00

U.S. Cl. 428—247 **16 Claims**



1. A transparent static reducing mat comprising,

a transparent base of insulating plastic material having a top surface for carrying the weight of movable loads and a bottom surface for contacting carpeting to be protected,

and a plurality of thin conducting essentially invisible electrically interconnected fibers above said base defining a static-charge-draining conducting layer,

said mat being transparent so that the color and texture of carpeting or other material when in contact with said bottom surface shows through said top surface and said conducting layer,

wherein said thin conducting essentially invisible electrically interconnected fibers are microscopically fine electrostatically conductive fibers chemically bonded to the surface of said transparent base.

4,590,121

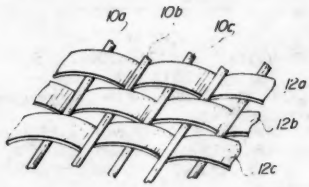
SAIL CLOTH

Peter Mahr, 32 Fleming La., Fairfield, Conn. 06430

Filed Mar. 7, 1985, Ser. No. 709,221

Int. Cl.⁴ B32B 7/00

U.S. Cl. 428—258 **4 Claims**



1. An improved sail cloth comprising a plurality of spaced fibrous yarns extending in one direction in the cloth, said yarns being composed of a polymer selected from the group consisting of polyester, aramid, polyamid, and carbon, and a plurality of spaced tapes extending in the other direction in said cloth at right angles to said yarns and being woven with said yarns, said tapes being composed of polymeric film selected from the group consisting of polyester, polyamid, acrylic and polyolefin, said tapes being at least 4 times wider than said yarns and serving to reduce the porosity of said cloth.

4,590,122

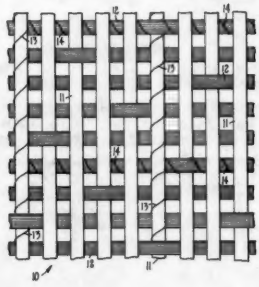
HIGH CONDUCTIVITY GRAPHITE MATERIAL WITH ELECTRICALLY CONDUCTIVE FILAMENTS WRAPPED AROUND WARP AND FILL ELEMENTS

Jordan Levin, Winona, Minn., assignor to Fiberite Corporation, Winona, Minn.

Filed Dec. 18, 1980, Ser. No. 217,707

Int. Cl.⁴ B32B 7/00

U.S. Cl. 428—260 **13 Claims**



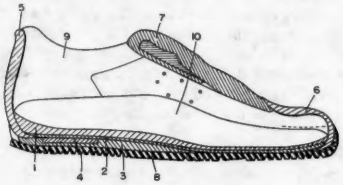
1. A drapable and formable woven graphite fabric comprising a ply consisting essentially of multifilament graphite warp elements and multifilament graphite fill elements, wherein an effective number of electrically conductive filaments having an electrical resistivity less than that of graphite, sufficient to prevent charge buildup caused by lightning or electrical storm on the graphite fabric, is woven into said woven graphite fabric.

4,590,123

LOW-RESILIENCE RUBBER COMPOSITIONS AND FOAMS

Takatsugu Hashimoto, Higashimurayama, and Takashi Ohashi, Iruma, both of Japan, assignors to Bridgestone Tire Co., Ltd., Tokyo, Japan

Division of Ser. No. 640,365, Aug., 1984, Pat. No. 4,546,127, which is a continuation of Ser. No. 484,510, Apr. 13, 1983, abandoned. This application Jul. 16, 1985, Ser. No. 755,563
Claims priority, application Japan, Apr. 13, 1982, 57-60429; Nov. 25, 1982, 57-205551
Int. Cl.[4] C08V *9/32*
U.S. Cl. 428—316.6 35 Claims



1. A cellular low-resilience rubber foam having a resilience of 35% or lower in a service temperature range of from −10° C. to 50° C. and a permanent compressive set of 5 to 50% prepared by mixing

(a) 100 parts by weight of a polymeric material comprising a styrene-butadiene copolymer or a mixture of styrene-butadiene copolymers having a styrene content of 53 to 75% by weight of the copolymer or copolymer mixture, and 0 to 40% by weight of the polymeric material of another rubber ingredient,

(b) 30 to 300 parts by weight of a filler,

(c) 5 to 100 parts by weight of a plasticizer, and

(d) 0.5 to 60 parts by weight of a foaming agent, adding effective amounts of a vulcanizing agent and a vulcanizing accelerator to the mixture, and heating the mixture for curing and foaming.

4,590,124

STORM WINDOW FILM

Julian H. Schoenberg, Greenville, S.C., assignor to W. R. Grace & Co., Cryovac Div., Duncan, S.C.

Filed May 10, 1984, Ser. No. 609,067
Int. Cl.[4] B32B *5/16*
U.S. Cl. 428—339 22 Claims

1. An oriented multi-layer film comprising:

a cross-linked core layer consisting essentially of a linear low density polyethylene; and

two cross-linked surface layers each comprising a four component blend of (1) a linear low density polyethylene, (2) a linear medium density polyethylene, (3) an ethylene vinyl acetate copolymer and (4) at least one ultraviolet light stabilizer.

4,590,125

HEAT-SEALABLE MULTI-LAYER FILM STRUCTURES AND METHODS OF FORMING THE SAME

Riccardo Balloni, Fairport, and Jay Keung, Macedon, both of N.Y., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Jan. 24, 1985, Ser. No. 694,541
Int. Cl.[4] B32B *27/00*
U.S. Cl. 428—349 16 Claims

1. A multi-layer film structure comprising coextruded laminate comprising:

(a) a base layer comprising polypropylene of comparatively high stereoregularity;

(b) a first heat sealable skin layer on the base layer comprising

first polyolefin of comparatively low stereoregularity, from about 5% to about 15% by weight of the layer of microcrystalline wax;

(c) a second heat sealable layer on the base layer comprising second polyolefin of comparatively low stereoregularity, from about 5% to about 15% by weight of the layer of microcrystalline wax;

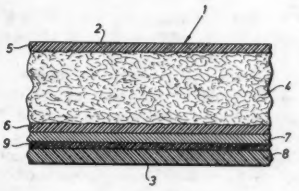
(d) the film structure having included therein an amount of fatty acid amide sufficient to provide said structure with coefficient of friction properties sufficient for high speed heat sealing packaging operations but insufficient to cause substantial hazing of said structure.

4,590,126

PACKING LAMINATE

Thorbjörn Andersson, Södra Sandby, Sweden, assignor to Tetra Pak International AB, Lund, Sweden

Filed Sep. 28, 1984, Ser. No. 655,721
Claims priority, application Sweden, Oct. 5, 1983, 8305473
Int. Cl.[4] B32B *27/00*
U.S. Cl. 428—349 6 Claims



1. A multi-layer packing laminate including a carrier layer of material imparting stiffness to the laminate, a layer of low-density polyethylene provided on one side of the carrier layer, a layer of foil provided on the layer of low-density polyethylene, a layer of adhesive material provided on the foil layer, an additional layer of low-density polyethylene provided on the opposite side of the carrier layer, the improvement comprising: a layer of liquid-tight material extruded on the adhesive layer, the layer of liquid-tight material being an admixture consisting of low-density polyethylene and linear low-density polyethylene.

4,590,127

ABRASIVE USED IN MAGNETIC RECORDING MEDIUM AND PRODUCTION THEREOF

Tadanori Hashimoto, Takatsuki; Kazuhiko Nakano, Katano, and Norio Matsuda, Ibaraki, all of Japan, assignors to Sumitomo Chemical Company, Limited, Osaka, Japan

Continuation of Ser. No. 545,278, Oct. 25, 1983, abandoned. This application Jan. 22, 1985, Ser. No. 693,226
Claims priority, application Japan, Nov. 2, 1982, 57-192843
Int. Cl.[4] H01F *10/02*
U.S. Cl. 428—405 6 Claims

1. In a magnetic recording medium comprising a support and

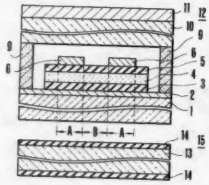
a magnetic recording layer coated thereon, the improvement wherein the magnetic recording layer comprises 0.1 to 15 parts per 100 parts of a magnetic powder material (weight by weight) of an abrasive having an oleophilic surface obtained by subjecting a non-magnetic inorganic powder material having a Mohs hardness of 5 or above and an average particle size of 0.1 to 2 μm and selected from the group consisting of γ-alumina, α-alumina, chromium oxide and titanium oxide to a wet contact treatment with an aqueous solution or an organic solvent solution of a dispersing agent having an oleophilic group and drying the treated powder material.

4,590,128

THIN FILM EL ELEMENT

Hisao Kawai, Yamanashi, Japan, assignor to Hoya Corporation, Tokyo, Japan

Filed Feb. 22, 1985, Ser. No. 704,380
Claims priority, application Japan, Feb. 24, 1984, 59-34017
Int. Cl.[4] B32B *9/04, 17/06*
U.S. Cl. 428—411.1 **11 Claims**



1. An electroluminescense element having a luminescence layer sandwiched between tranparent electrodes and back electrodes formed on a transparent substrate respectively in the form of a matrix, so as to generate luminescence upon the application of an electric field between said transparent electrodes and back electrodes, wherein a light reflector for reflecting light passing between adjacent back electrodes is arranged behind said back electrodes, and a light absorber for absorbing visible, reflected light of said electroluminiescence element is arranged on the light extracting side of said transparent electrodes.

4,590,129

FLUOROALIPHATIC-THIO,-SULFINYL, OR SULFONYL SUBSTITUTED BICYCLOALIPHATIC AMIC ACID AMINE SALTS, AND COMPOSITIONS AND USE THEREOF

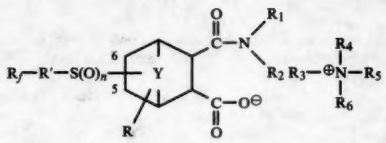
Jürgen Kaschig, Freiburg, Fed. Rep. of Germany; Eduard K. Kleiner, Pound Ridge, N.Y.; Karl F. Mueller, New York, N.Y., and Thomas W. Cooke, Mahopac, N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Division of Ser. No. 503,435, Jun. 13, 1983, Pat. No. 4,515,640. This application Jan. 17, 1985, Ser. No. 692,256
Int. Cl.[4] D21D *3/00;* **B32B** *9/02, 27/00*
U.S. Cl. 428—425.1 **8 Claims**

1. A process for rendering a cellulosic or natural or synthetic polyamide substrate oil and water repellant comprising

(A) contacting said substrate with an oil and water repellant imparting effective amount of an aqueous emulsion comprising

(a) 0.01% to 5% by weight of a fluoroaliphatic substituted bicycloaliphatic amic acid amine salt of the formula



(I)

wherein

R_f is straight or branched chain perfluoroalkyl of 4 to 18 carbon atoms or perfluoroalkoxy-perfluoroalkyl of 4 to 18 carbon atoms;

R′ is straight or branched chain alkylene of 1 to 12 carbon atoms, alkylenethioalkylene of 2 to 12 carbon atoms, alkyleneoxyalkylene of 2 to 12 carbon atoms, or alkyleneiminoalkylene of 2 to 12 carbon atoms where the imino nitrogen atom contains as a third substituent, hydrogen or alkyl of 1 to 6 carbon atoms;

n is 0, 1 or 2;

Y is lower alkylene or —O—;

R_1 and R_2 are independently hydrogen, lower alkyl, hydroxy-lower alkyl, or together with the nitrogen to which they are attached, represent morpholino;

R_3, R_4 and R_5 independently represent hydrogen, lower alkyl, or hydroxy-lower alkyl,

R_6 is lower alkyl, benzyl, lower alkyl substituted by hydroxy, carboxy or sulfo, or together with R_5 and the nitrogen to which they are attached represent morpholino;

R is hydrogen or methyl; and

wherein the R_f—R′—S(O)$_n$— group is in the 5- or 6-position

(b) 0%–3% by weight emulsifier;

(c) 0%–5% by weight filler, water repellant assistant, coloring agent, or surface conditioner adjuvant;

(d) 0%–10% by weight sizing agent; and

(e) the remainder water; and

(B) drying the treated substrate.

4,590,130

SOLID STATE ZONE RECRYSTALLIZATION OF SEMICONDUCTOR MATERIAL ON AN INSULATOR

Harvey E. Cline, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

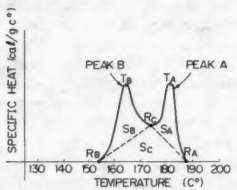
Filed Mar. 26, 1984, Ser. No. 593,064
Int. Cl.[4] B32B *9/04, 9/00, 19/00*
U.S. Cl. 428—446 **8 Claims**

1. In a laminated article of manufacture comprising a dielectrically isolated film of crystalline semiconductor material supported on a substrate, said substrate and said crystalline film being separated by an amorphous dielectric layer, the improvement wherein said crystalline film is a single crystal and has a substantially uniform thickness in the range of from 100 to about 10,000 Angstroms, said thickness varying no more than ±5% from a nominal thickness, and any sub grain boundaries present in said single crystal are not aligned but are not randomly oriented.

4,590,131
PACKAGING MATERIAL

Jinichi Yazaki, and Kazuhiko Tsurumaru, both of Tokyo, Japan, assignors to Toyo Seikan Kaisha, Ltd., Tokyo, Japan

Filed Oct. 5, 1984, Ser. No. 658,166
Claims priority, application Japan, Feb. 17, 1984, 59-27353
Int. Cl.[4] B32B *27/08*
U.S. Cl. 428—516 9 Claims



1. A packaging material having at least one layer comprising an ethylene-vinyl alcohol copolymer having a vinyl alcohol content of 40 to 80 mole % and a residual vinyl ester content lower than 4 mole %, wherein the ethylene-vinyl alcohol copolymer consists of a composition comprising a plurality of ethylene-vinyl alcohol copolymers differing in the vinyl alcohol content, said composition shows a plurality of endothermic peaks in a fusion curve by a differential scanning calorimeter, the composition has fusion characteristics satisfying requirements represented by the following formulae:

$$0.8 \geqq \frac{Sc}{Sa + Sb + Sc} \geqq 0.3$$

and

$$25° \text{ C.} \geqq Ta - Tb > 10° \text{ C.}$$

wherein Sc represents an area of a triangle defined by a base line connecting the skirt of a high temperature side peak to the skirt of a low temperature side peak in two adjacent peaks in said fusion curve and lines connecting the skirts of both the peaks to the trough between both the peaks, Sa represents an area of the high temperature side peak above said triangle, Sb represents an area of the low temperature side peak above said triangle, Ta represents a peak temperature of the high temperature side peak and Tb represents a peak temperature of the low temperature side peak, and the composition has a molecular weight distribution ($\overline{Mw}/\overline{Mn}$) of at least 2.5.

4,590,132
COMPOSITE MATERIAL REINFORCED WITH ALUMINA-SILICA FIBERS INCLUDING MULLITE CRYSTALLINE FORM

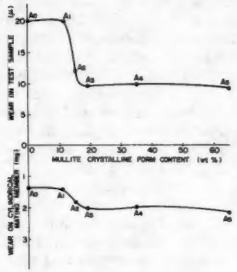
Tadashi Dohnomoto; Masahiro Kubo, both of Toyota, and Haruo Kito, Aichi, all of Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Toyota and Isolite Babcock Refractories Co., Ltd., Hoi, both of, Japan

Filed Apr. 23, 1985, Ser. No. 726,358
Claims priority, application Japan, Oct. 25, 1984, 59-225011
Int. Cl.[4] B32B *5/02, 9/00*
U.S. Cl. 428—614 11 Claims

1. A composite material, consisting essentially of:

(a) a reinforcing alumina—silica fiber material containing the mullite crystalline form with the principal components being about 35% to about 65% by weight of SiO_2, about 35% to about 65% by weight of Al_2O_3, and other substances in an amount of less than or equal to about 10% by weight, with the weight percentage of the mullite crystalline form therein being at least about 15%, and with the weight percentage of included non-fibrous particles with diameters greater than about 150 microns being not more than about 5%; and

(b) a matrix metal selected from the group consisting of



aluminum, magnesium, copper, zinc, lead, tin, and alloys having these metals as principal components; and wherein the volume proportion of said alumina—silica fibers is at least 0.5%.

4,590,133
BEARING MATERIAL

Kenneth Lloyd, Grosse Pointe Park, Mich., assignor to D.A.B. Industries, Madison Heights, Mich.

Filed Feb. 1, 1985, Ser. No. 697,158
Int. Cl.[4] B32B *15/01*
U.S. Cl. 428—653 2 Claims

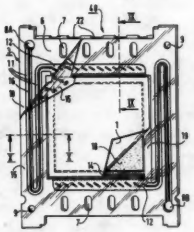
1. A bearing comprising bearing material bonded to a steel backing and without an overlay plate on the exposed surface of the bearing material, said bearing material consisting essentially of

4.25%–7% by weight of bismuth
2%–2.5% by weight of silicon
0.7%–1.3% by weight of copper
1.25%–2.3% by weight of lead
balance aluminum.

4,590,134
FUEL CELL STRUCTURES

Bernard Warszawski, Paris; Pierre Fauvel, Limours, and Jean Arlie, Saint Saulge, all of France, assignors to Occidental Chemical Corporation, Niagara Falls, N.Y.

Filed May 13, 1985, Ser. No. 733,030
Claims priority, application France, May 11, 1984, 84 07312
Int. Cl.[4] H01M *8/24*
U.S. Cl. 429—35 7 Claims



1. In a fuel cell structure constituted by a plurality of cells disposed in electrical contact with one another, each cell comprising:

first and second porous electrodes which are plane in shape

with parallel faces, one being a cathode and the other an anode, and each including a specific catalyst;

an electrolyte filling the gap situated between each said electrodes; and

two impermeable bipolar current collectors, each including at least a central conductive zone having channels on each face of said collectors, a first collector making electrical contact via the high points of its cathode face with the external surface of said cathode, and via its anode face with the external surface of the anode of an adjacent cell, and a second collector making electrical contact via the high points of its anode face with the external surface of said anode, and via its cathode face with the cathode of the other adjacent cell, orifices within the top and bottom parts of said collectors situated on either side of the central conductive zones to allow the electrolyte and the fuel to flow through the cell structure, said two electrodes being applied on either side of a frame made of insulating plastic material and having a central orifice in the form of a quadrilateral, said electrodes and said frame together defining an electrolyte compartment, the top and bottom portions of the frame including orifices for conveying fuel and electrolyte through the cell structure, said fuel conveying orifices corresponding to the orifices provided in the collectors, such that an oxidizing gas flows between said cathode and the cathode face of the first collector, and a fuel gas flows between said anode and the anode face of the second collector, means provided on one face of said frame to enable electrolyte to be conveyed from one of said electrolyte-conveying orifices acting as an inlet orifice, to the electrolyte compartment, and from said compartment to another electrolyte-conveying orifice acting as an outlet orifice, said electrolyte-conveying means including grooves that open out into hollow portions that constitute electrolyte distributing and collecting manifolds disposed on the top and bottom portions of the frame along two opposite sides of the central orifice and in communication with the electrolyte chamber by means of a plurality of parallel microchannels delimited by ribs;

the improvement wherein the electrolyte distribution network is sealed firstly by a thin film of insulating plastic material which extends at least over the means provided for conveying the electrolyte between the inlet orifice, the outlet orifice and the electrolyte compartment, said film being fixed to said electrode-supporting frame, and secondly by said first electrode being pressed against the frame such that it overlaps said film and being fixed in a sealed manner to the film in the region of overlap.

4,590,135

FUEL CELL STRUCTURES

Bernard Warszawski, Paris; Pierre Fauvel, Limours, and Sylvain Dupré, Chilly Mazarin, all of France, assignors to Occidental Chemical Corporation, New York, N.Y.

Filed May 13, 1985, Ser. No. 733,028

Claims priority, application France, May 11, 1984, 84 07314

Int. Cl.⁴ H01M *8/24*

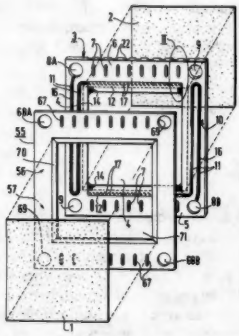
U.S. Cl. 429—38 **8 Claims**

1. In a fuel cell structure constituted by a plurality of cells disposed in electrical contact with one another, each cell comprising:

first and second porous electrodes which are plane in shape with parallel faces, one being a cathode and the other an anode, and each include a specific catalyst;

an electrolyte filling the gap situated between said electrodes; and

two impermeable bipolar current collectors, including at least a central conductive zone having channels on each face of said collectors, a first collector making electrical contact via the high points of its cathode face with the external surface of said cathode, and via its anode face with the external surface of the anode of an adjacent cell, and a second collector making electrical contact via the high points of its anode face with the external surface of said anode, and via its cathode face with the cathode of the other adjacent cell, said collectors having top and bottom parts situated on either side of central conductive zones, orifices provided in said top and bottom parts to allow electrolyte and fuel to flow through the cell structure, the first electrode being pressed against a first frame of insulating plastic material and having a central orifice in the shape of a quadrilateral, said frame including bottom and top portions having orifices for conveying fuel and electrolyte through the cell structure, said frame orifices corresponding to the orifices provided in the collectors, means provided on one face of said frame for conveying electrolyte from one of said electrolyte-conveying orifices acting as an inlet orifice, to an electrolyte compartment situated between the two electrodes, and from said compartment to another electrolyte-conveying orifice acting as an outlet orifice, said means including grooves that open out into hollow portions constituting electrolyte distributing and collecting manifolds disposed on the top and bottom portions of the frame along two opposite sides of the central orifice and in communication with the electrolyte chamber by means of a plurality of parallel microchannels delimited by ribs;



the improvement wherein the fuel cell structure further includes a second frame of an insulating plastic material, having the same contour as the first frame against which the first electrode is pressed and having electrolyte and fuel conveying orifices corresponding to those provided in said first frame, said second frame being applied by a plane face on the face of the first frame having the grooves and the distributing and collecting manifolds, and being fixed to said first frame in such a manner as to seal the electrolyte distribution network, the second electrode being pressed against the other face of the second frame, and the electrolyte compartment being defined by the electrodes and the central orifices of the two frames; whereby, upon supply of the fuel and electrolyte to said orifices for conveying fuel and electrolyte within said first and second frames, an oxidizing gas flows between said cathode and the cathode face of the first collector, and a fuel gas flows between said anode and the anode face of the second collector.

4,590,136

ELECTROCHEMICAL STORAGE CELL OF THE ALKALI METAL AND CHALCOGEN TYPE

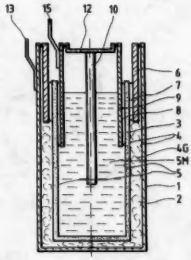
Werner Buehler, Dossenheim; Stefan Mennicke, Leimen; Karl Reiss, Muehlhausen-Rettigheim, and Susanne Terharn, Heidelberg, all of Fed. Rep. of Germany, assignors to Brown, Boveri & Cie AG, Mannheim, Fed. Rep. of Germany

Filed Apr. 1, 1985, Ser. No. 718,063

Claims priority, application Fed. Rep. of Germany, Apr. 2, 1984, 3412206

Int. Cl.[4] H01M *10/04*

U.S. Cl. 429—104 3 Claims



1. Electrochemical storage cell based on alkali metal and chalcogen with at least one anode chamber and one cathode chamber which are separated from each other by an alkali ion-conducting solid electrolyte and are bounded at least in some regions by a metallic housing, the solid electrolyte being fastened at its open end to the housing via a connecting element, built as a pressure ring and at least one compensating ring taking up the forces emanating from the pressuring ring and both are fastened at the open end of the solid electrolyte, the compensating ring is arranged in the interior of the solid electrolyte and the pressure ring is arranged around the outside surface of the solid electrolyte, the pressure ring and the compensating ring are fastened to the solid electrolyte via a glass or ceramic layer, the lower end of the pressure ring terminating with the lower end of the layer, the lower end of the compensating ring terminating with the lower end of the layer below the lower end of the pressure ring, and the pressure ring is made of metal or ceramic and the compensating ring is made of an iron, cobalt or nickel alloy.

4,590,137

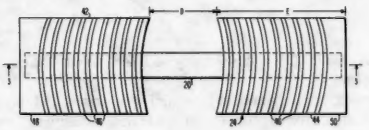
METHOD AND APPARATUS FOR SCREENING LINE SCREEN SLIT MASK COLOR PICTURE TUBES

Ralph J. D'Amato, Lancaster, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed Mar. 30, 1984, Ser. No. 595,531

Int. Cl.[4] G03C *5/00*; G03B *41/00*

U.S. Cl. 430—24 3 Claims



1. In a method of screening a line screen slit mask color picture tube, including coating a faceplate panel of said tube with a photosensitive material, said faceplate panel having a major axis and a minor axis, inserting a slit shadow mask into said panel, and exposing said photosensitive material by passing light from a line light source through the slits said mask, the improvement comprising:

positioning, between said light source and said shadow mask, a means for varying the effective length of said line light source, with respect to both said major and minor axes, when viewed from different locations on said faceplate panel, said means for varying the effective length of said line light source including an optical aperture having a plurality of shadowing elements therein, said shadowing elements providing exposure of a greater portion of said line light source at one location of said faceplate than at another location of said faceplate, whereby exposure at said one location is provided by said aperture and said shadowing elements and exposure at said another location is provided by said aperture.

4,590,138

POSITIVE-WORKING PHOTORESIST COMPOSITION AND METHOD FOR FORMING A LIGHT-ABSORBING MATRIX IN A COLOR CRT STRUCTURE

Robert L. Lambert, Seneca Falls; Judy A. Nagel, Romulus, and Robert L. Bergamo, Seneca Falls, all of N.Y., assignors to North American Philips Consumer Electronic Corp., New York, N.Y.

Division of Ser. No. 548,747, Nov. 4, 1983, Pat. No. 4,546,064, which is a continuation of Ser. No. 364,949, Apr. 2, 1982, abandoned. This application May 1, 1985, Ser. No. 729,453

Int. Cl.[4] G03C *5/00*

U.S. Cl. 430—25 4 Claims

1. A method of providing a color cathode ray tube screen including a viewing panel and discrete color luminescing areas responsive to electron excitation positioned on the inner surface of said viewing panel with a black, light-absorbing matrix separating said color luminescing areas, said method comprising the steps of:

(a) providing on a surface of the inner surface of the viewing panel of a glass cathode ray tube envelope a thin aqueous layer of 3–7% by volume mixture in water of about 1 mole of approximately polyvinyl acetate 88% hydrolyzed to; polyvinyl alcohol, about 0.5–1.5 moles of 1,4-butanediol, about 0.5–1.5 moles of ammonium trioxalatoferrate, about 0.05–0.07 mole of ferric nitrate and about 3–12 moles of finely divided graphite or lampblack;

(b) drying said thin aqueous layer at room temperature for about 15–180 seconds to cause said thin layer to become immobile;

(c) exposing areas of said thin layer corresponding to said color luminescing areas to ultra-violet radiation for a time sufficient to cause said exposed areas to become water soluble.

(d) heating said thin layer at a temperature of about 95°–120° F. for about 1–3 minutes to thereby remove the remainder of water from said thin layer matrix and render water-insoluble the unexposed areas of said layer;

(e) removing the exposed portions of said layer from said surface by developing said layer with water, thereby providing said surface with a black, light absorbing, matrix surrounding areas of said surface suitable for coating by phosphors for forming said color luminescing areas.

4,590,139

THREE COLOR TONER KIT AND METHOD OF USE

Eiichi Imai, Narashino, and Motoo Urawa, Funabashi, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 532,518, Sep. 15, 1983, abandoned. This application Oct. 21, 1985, Ser. No. 789,348

Claims priority, application Japan, Sep. 27, 1982, 57-168114; Sep. 27, 1982, 57-168115

Int. Cl.[4] G03G *13/01*, *9/08*

U.S. Cl. 430—45 3 Claims

1. A method for forming multi-color images by electrostatography, comprising:

developing elocrostatic latent images with a yellow toner, a magenta toner, and a cyan toner;

transferring the resultant color toner images to a recording medium, and

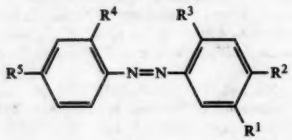
fixing the transferred toner images on the recording medium, thereby to obtain multi-color images; wherein said yellow, magenta and cyan toners respectively comprising 100 parts by weight of a resin exhibiting a melt flow viscosity of 10^5 cp at a temperature of T_1 and a melt flow viscosity of 0.5×10^5 cp at a temperature of T_2, said temperatures T_1 and T_2 satisfying the following relationships:

$$T_1 = 100° \text{ to } 150° \text{ C. and } \Delta T = |T_1 - T_2| = 5$$

to 30° C., and 0.3 to 10 parts by weight of a corresponding color of colorants selected from the group consisting of yellow colorants, magenta colorants, and cyan colorants

(A) said yellow colorants being:

(1) colorants represented by the formula (I):



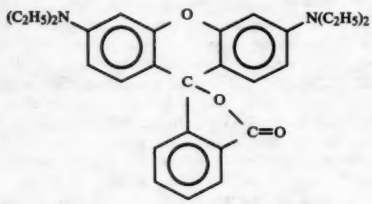
(I)

Wherein R^1 is a lower alkyl, R^2 and R^3 are each independently hydrogen or hydroxyl, R^4 is hydrogen or hydroxyl and R^5 is hydrogen, acyl, or amino having a terminal acyl; and

(2) colorants to be classified under C.I. Disperse Yellow 164,

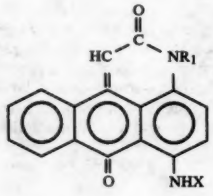
(B) said magenta colorants being:

(3) the colorant represented by the formula (II):



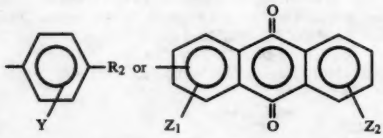
(II)

and (4) colorants represented by the formula (III):



(III)

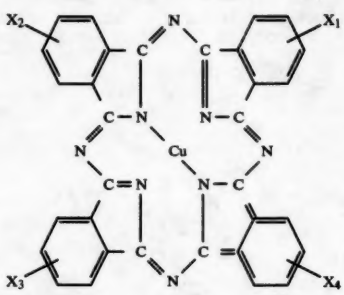
wherein X is a substituent represented by the formula:



R_1 is hydrogen, alkyl, hydroxyl, phenyl or phenyl having a hydrogen, halogen or alkyl substituent, sulfo or any of salts thereof with alkali metals, alkaline earth metals, ammonium ion, aliphatic ammonium ion or heterocyclic ammonium ion; Z_1 and Z_2 are each independently hydrogen, hydroxy or alkyl,

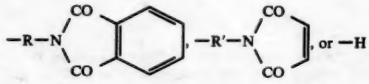
(C) said cyan colorants being:

(5) colorants represented by formula (IV):



(IV)

wherein X_1,X_2,X_3 and X_4 are each independently:



wherein R and R′ are an alkylene having 1 to 5 carbon atoms, with the proviso that the number of hydrogen atoms in each of X_1–X_4 is any of 0, 1, 2 and 3.

4,590,140

TONER APPLICATION METHOD AND TREATED MAGNETIC PARTICLES FOR USE THEREIN

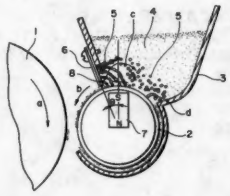
Yasuo Mitsuhashi, Yokohama; Masanori Takenouchi, Urawa; Hatsuo Tajima, Matsudo; Masaki Uchiyama, Nakamachi; Motoo Urawa, Funabashi, and Kenji Okado, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 9, 1984, Ser. No. 658,779

Claims priority, application Japan, Oct. 19, 1983, 58-195603

Int. Cl.⁴ G03G *13/08, 13/09*

U.S. Cl. 430—102 **10 Claims**



1. A method for developing a latent electrostatic image comprising:

forming, in a container containing a toner and magnetic particles for application of the toner, a magnetic brush of the magnetic particles;

circulating the magnetic particles in the container; and

forming a thin layer of the toner electrically charged on the toner carrying member, wherein the magnetic particles have been treated with a substance A having a position opposite to that of the toner in the triboelectric series with the material constituting at least the surface of the toner carrying member as the standard substance and with a substance B having a position between the substance A

and the toner in the triboelectric series, and applying said thin layer of toner to develop said electrostatic image.

4,590,141

CARRIER PARTICLES FOR USE IN A TWO-COMPONENT DRY-TYPE DEVELOPER FOR DEVELOPING LATENT ELECTROSTATIC IMAGES

Mitsuo Aoki, Numazu; Satoru Inoue, Mishima; Kimitoshi Yamaguchi, Numazu; Mitsuru Uchida, Susono; Masami Tomita, Numazu, and Chiaki Uematsu, Fuji, all of Japan, assignors to Ricoh Company, Tokyo, Japan

Continuation-in-part of Ser. No. 479,406, Mar. 28, 1983, abandoned. This application Oct. 19, 1984, Ser. No. 662,796

Claims priority, application Japan, Apr. 8, 1982, 57-57313; May 28, 1982, 57-89877

Int. Cl.[4] G03G *9/10*

U.S. Cl. 430—108 **13 Claims**

1. Carrier particles for use in a two-component dry-type developer for developing latent electrostatic images to visible images, comprising a core material and a silicone resin layer coated on the surface of said core material, said silicone resin layer comprising a silicone resin and, as a fortifying agent against abrasion of said carrier particles, inorganic fortifying filler particles selected from the group consisting of silicon carbide and potassium titanate.

4,590,142

CAPSULE TONER

Masuo Yamazaki, Kawasaki; Toru Matsumoto, Tokyo; Katsutoshi Wakamiya, Yokohama; Ichiro Ohsaki; Toshiaki Nakahara, both of Kawasaki, and Hisayuki Ushiyama, Hiratsuka, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 29, 1984, Ser. No. 645,404

Claims priority, application Japan, Sep. 9, 1983, 58-166150

Int. Cl.[4] G03G *9/08*

U.S. Cl. 430—138 **6 Claims**

1. A capsule toner comprising solid core particles and a shell material coating each of said solid core particles in which said solid core particles are comprised of a core material of a wax or a mixture of waxes exhibiting a cloud point within the range of from 30 to 90 and a penetration within the range of from 2 to 15, said capsule toner being obtained by dispersing said solid core particles in a solution of a shell material in a solvent for said shell material and encapsulating each of said solid core particles with said shell material by spraying the resultant dispersion or by a phase separation method comprising adding gradually a poor solvent for said shell material into the resultant dispersion.

4,590,143

TWO-COMPONENT DIAZOTYPE MATERIAL WITH DIAZONIUM SALT WITH ANION OF BENZENE OR TOLUENE SULFONATE

Siegfried Scheler, Wiesbaden, Fed. Rep. of Germany, assignor to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

Filed Feb. 28, 1984, Ser. No. 584,546

Claims priority, application Fed. Rep. of Germany, Mar. 9, 1983, 3308395

Int. Cl.[4] G03C *1/54, 1/78*

U.S. Cl. 430—163 **10 Claims**

1. A two-component diazotype material, comprising a support and at least one light-sensitive layer provided on said support, said layer consisting essentially of, in admixture, (i) a first amount of at least one light-sensitive diazonium compound derived from p-phenylenediamine and carrying a basic heterocyclic radical in the 4-position and ether groups in the 2- and 5-positions, said first amount being sufficient to impart photosensitivity to said layer; (ii) a second amount of a coupler component, said second amount being sufficient to permit initiation of a coupling reaction with said diazonium compound when said diazotype material is exposed; and (iii) an acid stabilizer, said diazonium compound comprising an anion selected from the group consisting of a benzenesulfonate and a p-toluene-sulfonate.

4,590,144

PHOTOPOLYMERIZABLE RECORDING MATERIAL AND THE PRODUCTION OF RELIEF PLATES USING THIS RECORDING MATERIAL

Gunnar Schornick, Hettenleidelheim; Mong-Jon Jün, Speyer; Axel Sanner, Frankenthal; August Lehner, Roedersheim-Gronau; Werner Lenz, Bad Durkheim; Peter Richter, and Albrecht Eckell, both of Frankenthal, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Continuation of Ser. No. 400,700, Jul. 22, 1982, abandoned. This application Jul. 13, 1984, Ser. No. 630,833

Claims priority, application Fed. Rep. of Germany, Aug. 18, 1981, 3131766

Int. Cl.[4] G03C *1/70, 1/71*; G03F *7/10*

U.S. Cl. 430—273 **13 Claims**

1. A photopolymerizable recording material comprising a base A, a photopolymerizable layer B which is soluble or at least dispersible in an alcohol or alcoholic solution, and a top layer C which is soluble in the alcohol or alcoholic solution and/or a cover sheet which can be striped off the photopolymerizable layer B, the photopolymerizable layer B comprising

(1) a polymeric binder,

(2) at least one photopolymerizable, ethylenically unsaturated, low molecular weight compound, and

(3) a photopolymerization initiator,

wherein the photopolymerizable layer B contains, as the binder (component B1), a substantially linear, high molecular weight, thermoplastic polyurethane which is solid at room temperature, contains acryloyl and/or methacryloyl groups as side groups, does not possess any quaternary and/or quaternizable nitrogen atoms, and is obtained by reacting a mixture of

(a) from 15 to 30% by weight of a diisocyanate,

(b) from 50 to 80% by weight of at least one polyetherdiol, having a molecular wieght of from 250 to 4,000 and selected from the group consisting of polyethylene glycol, polypropylene glycol and ethyleneglycol/-propyleneglycol co-polycondensates or mixtures of at least 50% by weight of at least one of the said polyether-diols and up to 50% by weight of at least one further compatible polydiol,

(c) from 0.5 to 15% by weight of a chain-extending compound which is bifunctionally reactive towards isocyanates and possesses acryloyl and/or methacryloyl groups in side branches, and

(d) from 1 to 10% by weight of another low molecular weight chain extender, each of the above percentages of the components of the reation mixture being based on the sum of the components (a), (b), (c), and (d), and the NCO/OH plus NH molar ratio provided by the reactants being from about 0.8 to 1.3.

4,590,145

PHOTOPOLYMERIZATION INITIATOR COMPRISED OF THIOXANTHONES AND OXIME ESTERS

Masanori Itoh; Fumio Takenaka, and Kouzi Tohya, all of Himeji, Japan, assignors to Daicel Chemical Industries, Ltd., Sakai, Japan

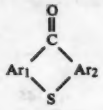
Filed Jun. 28, 1985, Ser. No. 750,703

Int. Cl.[4] G03C *1/68*

U.S. Cl. 430—281 **3 Claims**

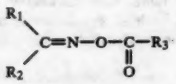
1. An initiator composition for photopolymerization which comprises:

(A) thioxanthone or a derivative thereof of the formula:



in which Ar_1 and Ar_2 each are an aromatic ring or a substituted aromatic ring, and

(B) an oxime ester of the formula:



wherein R_1 and R_2 may be the same or different and represent each an alkyl group having 1 to 10 carbon atoms, a substituted or unsubstituted phenyl, naphthyl, anthryl, pyridyl or quinolyl group or R_1 and R_2 may be bonded together to form a ring, and R_3 represents an alkyl group having 1 to 5 carbon atoms or a substituted or unsubstituted aryl group.

3. A photopolymerizable resin composition which comprises 5 to 80 percent by weight of a photopolymerizable compound having a double bond for polymerization, 0.01 to 20 percent by weight of the two initiators (A) and (B) as each defined in claim 1 and the balance is a polymer binder.

4,590,146

STABILIZATION OF PHOTOPOLYMERIZABLE MIXTURES

Guenter Wallbillich, Schifferstadt, Fed. Rep. of Germany, assignor to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Jul. 6, 1984, Ser. No. 628,320

Claims priority, application Fed. Rep. of Germany, Jul. 8, 1983, 3324642

Int. Cl.[4] G03C *1/68*

U.S. Cl. 430—281 **4 Claims**

1. In a process for stabilizing a photopolymerizable mixture consisting essentially of a polymer selected from the group consisting of vinyl alcohol polymers containing $-CH_2C-H(OH)$ structural units in the main chain, their water-soluble or water-dispersible copolymers and derivatives, cellulose derivatives, gelatin and vinyl pyrrolidone polymers, at least one polymerizable ethylenically unsaturated compound and at least one compound selected from the group consisting of photoinitiators and photosensitizers to thermal polymerization, the improvement which comprises: pretreating the polymer, prior to preparing said mixture, with a compound selected from the group consisting of halogens, psuedohalogens and polyhalides in the presence of water at from 20° to 100° C. in the course of from half an hour to several days.

4,590,147

DRY FILM RESISTS CONTAINING UNSATURATED OLIGOMER

Andrew A. Lindley, Warrington, England, assignor to Imperial Chemical Industries PLC, London, England

Filed Nov. 23, 1984, Ser. No. 674,318

Claims priority, application United Kingdom, Dec. 6, 1983, 8332519; Jun. 6, 1984, 8414437

Int. Cl.[4] G03C *1/68*

U.S. Cl. 430—286 **11 Claims**

1. A polymerisable composition consisting essentially of

(a) at least one polymerisable olefinically unsaturated oligomer which

(i) may be linear or branched,

(ii) is derived from one or more aromatic compounds and one or more aldehydes,

(iii) has a backbone which consists essentially of repeat units—$(Ar^1—CHR^1)$ wherein Ar^1, each of which may be the same or different, is an aromatic group, or a suitable substituted derivative thereof, and R^1, each of which may be the same or different, is a hydrogen atom or a hydrocarbyl group,

(iv) has pendant and/or terminal acyloxymethyl groups attached to the oligomer backbone in which the acyl group is derived from an olefinically unsaturated carboxylic acid,

(v) has a functionality of between 2 and 6, and

(vi) has a number average molecular weight of between 900 to 1100 and a weight average molecular weight of between 1900 and 2500;

(b) one or more polymeric binders each of which has a molecular weight of between 10,000 and 1,000,000; and

(c) a photoinitiator system for initiating polymerisation of the said at least one polymerisable olefinically unsaturated oligomer.

4,590,148

PROCESS FOR PRODUCING LIGHT SENSITIVE LITHOGRAPHIC PLATE REQUIRING NO DAMPENING SOLUTION

Hiroshi Takahashi; Hiroyuki Tamaki; Chikashi Ohishi, and Keisuke Shiba, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 12, 1985, Ser. No. 710,892

Claims priority, application Japan, Mar. 12, 1984, 59-46873

Int. Cl.[4] G03F *7/02*; G03C *5/00*

U.S. Cl. 430—303 **5 Claims**

1. A process for producing a light-sensitive lithographic plate requiring no dampening solution comprising (1) carrying out corona discharge treatment on the surface of a silicone rubber layer of a light-sensitive lithographic plate requiring no dampening solution wherein the silicone rubber layer is the top layer, (2) spraying a solution or dispersion containing a non-volatile solid component on said silicone rubber layer, and (3) drying to provide fine projection patterns, wherein said fine projection patterns have an average height in the range of about 0.5 to 50μ and are present in an amount of 1 to 1000/mm^2 on said silicone rubber layer.

4,590,149

METHOD FOR FINE PATTERN FORMATION ON A PHOTORESIST

Hisashi Nakane, Kawasaki; Akira Yokota, Yamato; Mitsuo Yabuta, Samukawa; Minoru Tsuda, Isehara, and Wataru Ishii, Hadano, all of Japan, assignors to Tokyo Ohka Kogyo Co., Ltd., Kawasaki, Japan

Filed Nov. 19, 1984, Ser. No. 672,763

Claims priority, application Japan, Nov. 28, 1983, 58-221985

Int. Cl.[4] G03F *7/26*

U.S. Cl. 430—325 **1 Claim**

1. A method for finely patterning a photoresist layer on a substrate which comprises the steps of:

(a) forming a layer of a negative photoresist composition comprising polymer and aromatic azide compound on a surface of a substrate;

(b) irradiating the photoresist layer in a pattern with actinic rays;

(c) heating the photoresist layer after said irradiation with actinic rays, in atmosphere kept at a temperature in the range from 200° to 500° C. for a length of time not exceeding 10 minutes; and, after heating,

(d) exposing the photoresist layer to an atmosphere of a plasma gas so as to decompose and remove the photoresist composition in the areas not irradiated with the actinic rays.

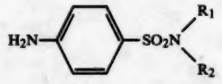
4,590,150

METHOD FOR PROCESSING SILVER HALIDE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL

Yoshihiro Fujita, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 29, 1985, Ser. No. 759,809
Claims priority, application Japan, Jul. 27, 1984, 59-158475
Int. Cl.[4] G03C 7/40, 5/24
U.S. Cl. 430—372 9 Claims

1. A method for continuously development processing an imagewise exposed silver halide color photographic light-sensitive material, comprising the use in a washing step or a stabilization step subsequent to bleaching and fixing steps or a bleach-fixing step of at least one compound represented by formula (I)



(I)

wherein R_1 and R_2 each represents a hydrogen atom, an alkyl group, a substituted alkyl group, an aryl group, a substituted aryl group, or a nitrogen-containing heterocyclic group.

4,590,151

REDUCTION OF RETICULATION IN GELATIN-CONTAINING ELEMENTS

Thomas C. Arter, Rochester, and Ignazio S. Ponticello, Pittsford, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.

Filed Nov. 29, 1982, Ser. No. 444,944
Int. Cl.[4] G03C 1/76, 1/30, 1/02; B41L 27/26
U.S. Cl. 430—537 22 Claims

1. An element comprising a support having thereon at least two contiguous gelatin-containing layers, the first uppermost layer containing an essentially water-soluble, non-diffusible vinyl polymer having one or more groups selected from the group consisting of 1) groups which react with gelatin to crosslink the polymer and gelatin and 2) amine groups, said uppermost layer containing from about 1 to about 90% by weight of said polymer and having a lateral swell coefficient in the absence of said polymer at least 10% greater than the second lower gelatin-containing layer, said first uppermost layer containing the polymer having amine groups also containing a hardener for gelatin, wherein said polymer reduces reticulation in said element.

12. A photographic element comprising a support having thereon a gelatin-containing radiation-sensitive layer and an overcoat layer comprising gelatin and an essentially water-soluble, non-diffusible vinyl polymer having one or more groups selected from the group consisting of 1) groups which react with gelatin to crosslink the polymer and gelatin and 2) amine groups, said overcoat layer comprising from about 1 to about 90% by weight of said polymer, said overcoat layer containing the polymer having amine groups also containing a hardener for gelatin, wherein said polymer reduces reticulation in said element.

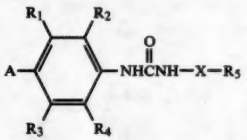
4,590,152

HEAT-DEVELOPABLE COLOR LIGHT-SENSITIVE MATERIAL

Kozo Sato, and Hideki Naito, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 8, 1985, Ser. No. 752,701
Claims priority, application Japan, Jul. 6, 1984, 59-140239
Int. Cl.[4] G03C 7/26
U.S. Cl. 430—543 16 Claims

1. A heat-developable color light-sensitive material comprising a support having thereon at least: (1) a light-sensitive silver halide, (2) a coupler capable of coupling with an oxidation product of a developing agent, (3) a hydrophilic binder, and (4) at least one compound represented by the following general formula (Z):



(Z)

wherein R_1, R_2, R_3 and R_4 each independently represents a hydrogen atom, a halogen atom, an alkyl group, an alkenyl group, a cycloalkyl group, an aralkyl group, a hydroxy group, an amino group, a substituted amino group, an alkoxy group, an acylamino group, an alkylsulfonylamino group, an arylsulfonylamino group, an aryl group, a carbamoyl group, a substituted carbamoyl group, a sulfamoyl group, a substituted sulfamoyl group, an acyl group, an acyloxy group or an alkoxycarbonyl group, or R_1 and R_2 or R_3 and R_4 are connected to each other to form a ring; A represents a hydroxy group, a group capable of providing a hydroxy group upon the function of a nucleophilic reagent or a group of

(wherein R_6 and R_7 each represents a hydrogen atom, a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkenyl group, a substituted or unsubstituted cycloalkyl group or a substituted or unsubstituted aralkyl group, or R_6 and R_7 are connected to each other to form a hetero ring), or when A represents the group of

R_1 and R_6 and/or R_3 and R_7 are connected to each other to form a hetero ring; R_5 represents a substituted or unsubstituted alkyl group, a substituted or unsubstituted alkenyl group, a substituted or unsubstituted cycloalkyl group, a substituted or unsubstituted aralkyl group or a substituted or unsubstituted aryl group; and X represents a group of

or a group of $-SO_2-$.

4,590,153

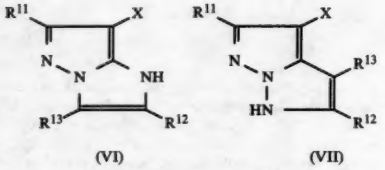
SILVER HALIDE COLOR PHOTOGRAPHIC MATERIALS

Toshio Kawagishi, and Nobuo Furutachi, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

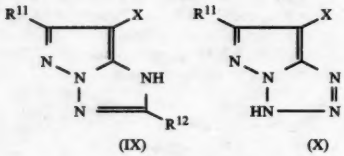
Filed Oct. 29, 1984, Ser. No. 665,886
Claims priority, application Japan, Nov. 1, 1983, 58-205278
Int. Cl.[4] G03C 7/26
U.S. Cl. 430—551 18 Claims

1. A silver halide color photographic material comprising a support having thereon at least a silver halide photographic layer, and photographic material contains (1) at least one magenta coupler selected from the group consisting of (i) compounds represented by following formulae (VI), (VII), (IX) and (X) and (2) at least one metal complex selected from the

group consisting of compounds represented by following formula (II), (III), (IV) and (V):

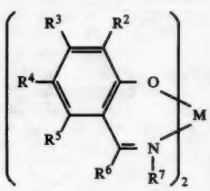


(VI) (VII)

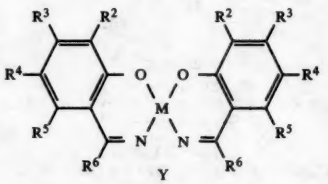


(IX) (X)

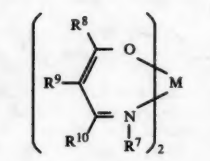
wherein R^{11}, R^{12} and R^{13} each represent a hydrogen atom, a halogen atom, an alkyl group, an aryl group, a heterocyclic ring group, a cyano group, an alkoxy group, an aryloxy group, a heterocyclicoxy group, an acyloxy group, a carbamoyloxy group, a silyloxy group, a sulfonyloxy group, an acylamino group, an anilino group, a ureido group, an imido group, a sulfamoylamino group, a carbamoylamino group, an alkylthio group, an arylthio group, a heterocyclic thio group, an alkoxycarbonylamino group, an aryloxycarbonylamino group, a sulfonamido group, a carbamoyl group, an acyl group, a sulfamoyl group, a sulfonyl group, a sulfinyl group, an alkoxycarbonyl group, or an aryloxycarbonyl group and substituted groups thereof, and X represents a hydrogen atom, a halogen atom, a carboxy group, or a coupling releasable group bonded to the carbon atom at a coupling position through an oxygen atom, a nitrogen atom or a sulfur atom or R^{12} and R^{13} combine with each other to form a 5-, 6- or 7-membered nonaromatic ring, or R^{12} and R^{13} in the coupler shown by formula (VII) combined with each other to form 5-, 6- or 7-membered saturated, unsaturated or aromatic ring; (ii) bis compounds containing coupler moieties derived from the above-described formulae wherein R^{11}, R^{12}, R^{13} or X represents a bond or a divalent group and forms a bis compound, (iii) a polymer coupler of a monomer-containing coupler moiety derived from at least one compound represented by the above-described formulae wherein R^{11}, R^{12}, R^{13} or X represents a vinyl group or a substituent having a vinyl group through a linkage group, said vinyl group being substituted or unsubstituted with the coupler moiety derived from formula (VI), (VII), (IX) or (X), a chlorine atom or a lower alkyl group having 1 to 4 carbon atoms, and (iv) a copolymer obtained from a monomer containing at least one coupler moiety selected from the group consisting of moieties derived from above-described formulae wherein R^{11}, R^{12}, R^{13} or X represents a vinyl group or a substituent having a vinyl group through a linkage group, said vinyl group being unsubstituted or substituted with the coupler moiety derived from formula (VI), (VII), (IX) or (X), a chlorine atom, or a lower alkyl group having 1 to 4 carbon atoms, and a non-coloring ethylenic monomer which does not cause coupling with the oxidation product of a primary aromatic amine color developing agent



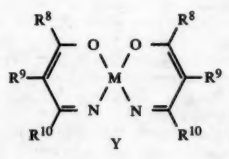
(II)



(III)



(IV)



(V)

wherein

M represents Cu, Co, Ni, Pd or Pt; R^2, R^3, R^4 and R^5 each represents a hydrogen atom, a halogen atom, a hydroxy group, a cyano group, or an alkyl, aryl, cycloalkyl, or heterocyclic group each bonded to a carbon atom of the benzene ring directly or through a divalent linking group; or R^2 and R^3, R^3 and R^4, or R^4 and R^5 combine with each other to form a nonmetallic atomic group necessary for forming a 6-membered ring;

R^6, R^9 and R^{10} each represents a hydrogen atom, an alkyl group, or an aryl group;

R^7 represents a hydrogen atom, an alkyl group, an aryl group, or a hydroxy group;

R^8 represents an alkyl group or an aryl group; or R^8 and R^9, or R^9 and R^{10} combine with each other to form a nonmetallic atomic group forming a 5-, 7-, or 8-membered ring; and

Y represents a nonmetallic atomic group forming a 5- or 6-membered ring.

4,590,154
HEAT DEVELOPABLE COLOR PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL CONTAINING SULFONAMIDE

Hiroyuki Hirai; Yoshiharu Yabuki; Masashi Takeuchi, and Toshiaki Aono, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 6, 1985, Ser. No. 730,925

Claims priority, application Japan, May 4, 1985, 59-89624

Int. Cl.[4] G03C *1/40, 5/54*

U.S. Cl. 430—559 **6 Claims**

1. A heat developable color photographic light-sensitive material comprising

(1) a light-sensitive silver halide,

(2) a hydrophilic binder,

(3) a dye releasing compound having an ability to reduce exposed light-sensitive silver halide and capable of reacting with the exposed silver halide upon heating, thereby releasing a mobile dye, and

(4) a non-dye releasing development accelerating sulfonamide compound represented by formula (I_0)

$$R_0—SO_2NH_2 \qquad (I_0)$$

wherein R_0 represents an alkyl group, an alkenyl group, an alkynyl group containing at least 4 carbon atoms, an aralkyl group, an aryl group, or a heterocyclic ring group, provided that the heterocyclic ring group is linked to $—SO_2NH_2$ through a carbon atom contained in the ring thereof.

4,590,155
EMULSION HAVING HIGH SILVER CHLORIDE CONTENT, PHOTOGRAPHIC RECORDING MATERIAL AND PROCESS FOR THE PRODUCTION OF PHOTOGRAPHIC RECORDINGS

Sieghart Klötzer, Cologne, Fed. Rep. of Germany, assignor to Agfa-Gevaert Aktiengesellschaft, Leverkusen-Bayerwerk, Fed. Rep. of Germany

Filed Mar. 6, 1985, Ser. No. 708,720

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1984, 3409442

Int. Cl.[4] G03C *1/02*

U.S. Cl. 430—567 **9 Claims**

1. Photographic silver halide emulsion in which the halide content consists substantially of chloride and the grains having at least one zone Z_{Br} having a high bromide content, comprising

(1) at least 60 mol % of the halide is chloride;

(2) the zone Z_{Br} is positioned between a core and the surface layer of the grain;

(3) the bromide content in the zone Z_{Br} amounts to at least 50 mol %; and

(4) no bromide-rich Zone Z_{Br} is present on the surface of the silver halide grains.

4,590,156
AGGLUTINATION ASSAY AND PRODUCT FOR RUBELLA ANTIBODY

Preston H. Dorsett, Memphis, Tenn., assignor to The University of Tennessee Research Corporation, Knoxville, Tenn.

Filed May 21, 1982, Ser. No. 380,537

Int. Cl.[4] G01N *33/546, 33/547*

U.S. Cl. 435—5 **40 Claims**

1. A composition, comprising:

solid particles sensitized with soluble rubella virus antigen, said sensitized particles being immunoreactive with early phase rubella antibody, said soluble rubella antigen having been obtained by disruption and solubilization of whole rubella virus.

22. In a direct agglutination assay for rubella virus antibodies employing solid particles sensitized with soluble rubella virus antigen, the improvement comprising:

employing in the assay solid particles sensitized with soluble rubella virus antigen, said sensitized particles being immunoreactive with early phase rubella antibody, said soluble rubella virus antigen having been obtained by disruption and solubilization of whole rubella virus.

4,590,157
METHOD FOR DETECTING ANTIGENS AND ANTIBODIES

Howard M. Chandler; Kevin Healey, and John G. R. Hurrell, all of Victoria, Australia, assignors to Commonwealth Serum Laboratories Commission, Australia

PCT No. PCT/AU81/00191, § 371 Date Aug. 6, 1982, § 102(e) Date Aug. 6, 1982, PCT Pub. No. WO82/02211, PCT Pub. Date Jul. 8, 1982

PCT Filed Dec. 22, 1981, Ser. No. 413,364

Claims priority, application Australia, Dec. 22, 1980, PE7043/80

Int. Cl.[4] G01N *33/50;* **C12Q** *1/58;* **C12N** *9/96*

U.S. Cl. 435—7 **13 Claims**

1. A method of detecting or determining the presence of antibodies or an antigenic or haptenic substance in a sample by the enzyme-linked immunosorbent assay technique which comprises binding of an antibody-enzyme or antigen-enzyme conjugate to a solid phase to indicate the presence or absence of antibodies or antigenic or haptenic substance in said sample, characterised in that the enzyme in said conjugate is urease, the solid phase is contacted with urea as the enzyme substrate, and the presence of ammonia is detected or determined using dibromo-o-cresolsulfonphthalein to indicate the presence of antibodies or antigenic or haptenic substances in the sample.

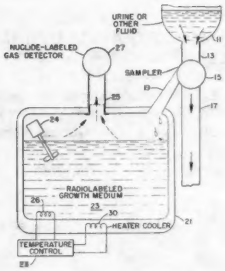
4,590,158
MICROBIAL MONITOR

Edward A. Eikman, 5116 Longfellow Ave., Tampa, Fla. 33609

Continuation-in-part of Ser. No. 80,327, Oct. 1, 1979, abandoned. This application Sep. 4, 1981, Ser. No. 299,614

Int. Cl.[4] C12Q *1/24*

U.S. Cl. 435—34 **19 Claims**



1. A system for continuous monitoring of fluid for microbial contamination comprising container means for containing a growth medium, sampling means in communication with said fluid and operable to aseptically divert said fluid to take periodic samples of said fluid and periodically introduce said samples into said growth medium over an extended period of time, and means for detecting changes that occur in the event of microbial growth in said growth medium during said extended period of time, said sampling means taking said samples automatically at spaced time intervals.

19. A method for continuous monitoring of fluid for the occurance of microbial contamination comprising providing a growth medium, periodically at spaced intervals introducing samples into said growth medium wherein successive samples are directed into the same growth medium, and detecting changes that occur in the event of microbial growth in said

growth medium, the interval between introducing successive samples into said growth medium being at least 10 minutes.

4,590,159

ENHANCEMENT OF EXPRESSION OF PROTEIN SYNTHESIS IN *E. COLI*

Alvin Markovitz, Chicago, Ill.; Barbara A. Zehnbauer, Madison, Wis.; Joyce M. Schoemaker, Chicago, Ill., and Marc F. Charette, Wollaston, Mass., assignors to University Patents, Inc., Westport, Conn.

Continuation of Ser. No. 295,121, Aug. 21, 1981. This application Aug. 17, 1983, Ser. No. 523,904

Int. Cl.[4] C12P *21/00;* C12N *15/00*

U.S. Cl. 435—68 **12 Claims**

1. A method for enhancing expression of exogenous gene directed protein synthesis in *Escherichia coli* cells having an exogenous gene incorporated therein, said method comprising the step of genetically transforming the cells to incorporate a dominant mucoid mutant allele of the capsular polysaccharide, capR, gene which capR gene is expressed in the transformed cells.

4,590,160

PROCESS FOR PRODUCTION OF β-GLYCOSYL STEVIOSIDE DERIVATIVES

Hideji Nishihashi, Urawa; Tadao Matsubayashi, Chiba; Tadashi Katabami, Urawa, and Ken-ichi Matsuda, Tokyo, all of Japan, assignors to Dainippon Ink and Chemicals, Inc. and Dic Fine Chemicals, Inc., both of Tokyo, Japan

Filed Feb. 25, 1983, Ser. No. 469,947

Claims priority, application Japan, Feb. 27, 1982, 57/31479

Int. Cl.[4] C12P *19/56, 19/18;* A23L *1/236*

U.S. Cl. 435—78 **20 Claims**

1. A process for producing a sweetener containing a β-1,3-glycosyl stevioside which is obtained by allowing an enzyme having β-1,4-glycosyl transferring activity or a microorganism capable of producing such an enzyme to react on an aqueous solution or aqueous suspension containing stevioside and at least one β-1,3-glycosyl sugar.

4,590,161

MICROBIOLOGICALLY PRODUCED L-PHENYLALANINE-DEHYDROGENASE, PROCESS FOR ITS RECOVERY AND USE

Maria-Regina Kula, Wolfenbüttel; Werner Hümmel, Brunswick; Horst Schütte, Salzgitter, and Wolfgang Leuchtenberger, Bruchköbel, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt and Gesellschaft fur biotechnologisch Forschung, Stockheim, both of, Fed. Rep. of Germany

Filed Feb. 24, 1984, Ser. No. 583,325

Claims priority, application Fed. Rep. of Germany, Mar. 1, 1983, 3307095

Int. Cl.[4] C12P *13/22, 13/12;* C12N *9/02;* C12R *1/13*

U.S. Cl. 435—108 **19 Claims**

1. L-phenylalanine-dehydrogenase having the following properties:

(a) it catalyzes the reductive amination of phenyl pyruvic acid to L-phenylalanine in the presence of ammonium ions and with NADH (nicotinamide-adenine-dinucleotide) as coenzyme.,

(b) it catalyzes the reductive amination of α-ketocarboxylic acids to the corresponding α-aminocarboxylic acids, including p-hydroxyphenyl pyruvic acid to L-tyrosine, indolyl pyruvic acid to L-tryptophane and 2-keto-4-(methylmercapto)-butyric acid to L-methionine, in the presence of ammonium ions and with NADH as coenzyme,

(c) it catalyzes the oxidative desamination of L-phenylalanine, l-tyrosine, L-tryptophane and L-methionine with NAD^+ as coenzyme,

(d) it has an optimum pH region for the reductive amination of 8.5±1, and

(e) it has an optimum pH region for the oxidative desamination of 10±1.

4,590,162

TRANSPOSABLE CLONING VECTOR

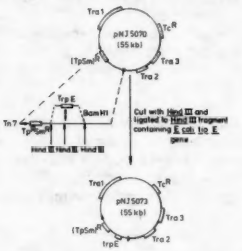
Nigel J. Grinter, Caernarvon, Wales, assignor to Imperial Chemical Industries, PLC, London, England

Filed Feb. 14, 1983, Ser. No. 466,146

Claims priority, application United Kingdom, Feb. 17, 1982, 8204573

Int. Cl.[4] C12N *15/00, 1/20, 1/00*

U.S. Cl. 435—172.3 **3 Claims**



1. A method for the insertion into the chromosome of a recipient Gram-negative bacterium of DNA material foreign to that bacterium which comprises the steps of (1) constructing a vector-containing microorganism which contains a carrier plasmid and a helper plasmid, the carrier plasmid carrying transposon Tn7 into whose DNA has been included the foreign DNA material to be inserted into the recipient bacterium and a part of whose DNA including the sequence specifying its transposition function has been removed and the helper plasmid carrying a fragment of DNA from transposon Tn7 including the sequence specifying its transposition function, (2) transferring the carrier and the helper plasmids directly or indirectly from the vector-containing microorganism into the recipient bacterium and, (3) growing the recipient bacterium for sufficient generations and under suitable conditions for the inserted foreign DNA material to pass into the chromosome of the recipient bacterium.

4,590,163

BROAD HOST RANGE DNA CLONING SYSTEM FOR GRAM-NEGATIVE BACTERIA

Donald R. Helinski, La Jolla, and Gary S. Ditta, Doway, both of Calif., assignors to The Regents of the University of California, Berkeley, Calif.

Continuation of Ser. No. 224,426, Jan. 12, 1981. This application Jan. 9, 1984, Ser. No. 568,943

Int. Cl.[4] C12N *1/00;* C12P *21/00, 21/02, 21/04, 19/34;* C12N *15/00, 1/20*

U.S. Cl. 435—317 **2 Claims**

2. A plasmid of from about 10kbp to 30kbp having an RK2 replication system and capable of replication in a plurality of Gram-negative bacteria, lacking self-transmissibility but capable of conjugal transfer by means of a helper plasmid in the same or different donor cell used for said conjugal transfer, wherein said capability for conjugal transfer is derived from RK2 and having at least one marker allowing for selection of transformants.

4,590,164

PROCESS FOR THE PREPARATION OF A GLUCOSE-FREE HEMOGLOBIN STANDARD

Thomas Gain, Munich, Fed. Rep. of Germany, assignor to Panchem GmbH, Kleinwallstadt, Fed. Rep. of Germany

Filed Mar. 26, 1984, Ser. No. 593,127

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1983, 3311458

Int. Cl.[4] G01N *31/00;* A01N *1/02;* C12Q *1/26;* C12N *9/96*

U.S. Cl. 436—15 9 Claims

1. A process for the preparation of a glucose-free hemoglobin standard comprising the steps of:

(a) washing an aliquot of erythrocytes with an isotonic salt solution,

(b) hemolyzing the erythrocytes to produce a hemolysate containing free and glycosylated hemoglobins,

(c) converting the free and glycosylated hemoglobins in the hemolysate into the corresponding cyanmethemoglobins by use of a dilute $K_3[Fe(CN)_6]$ solution and a dilute KCN solution,

(d) adding a Na phosphate-cyanide buffer to stabilize the hemolysate from step (c),

(e) removing the lipids and cellular remnants from the stabilized hemolysate of step (c) by use of an inert solvent,

(f) desalting the hemolysate obtained from step (e), and

(g) lyophilizing the hemolysate obtained from step (f).

4,590,165

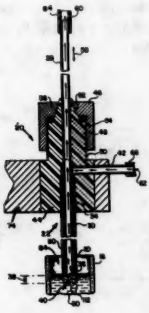
AUTOMATIC SAMPLING SYSTEM

Pieter Gilles, Rijswyk, Netherlands, and Jean-Claude Schmitt, Dravell, France, assignors to Baird Corporation, Bedford, Mass.

Division of Ser. No. 388,485, Jun. 14, 1982. This application May 3, 1984, Ser. No. 606,878

Int. Cl.[4] G01N *1/14*

U.S. Cl. 436—49 3 Claims



1. Process for automatically introducing a diluted viscous sample into an instrument for analysis of trace elements comprising:

(a) maintaining a tip of a tube assembly and a mixer blade operatively attached thereto as a unitary structure in a cleaning solvent, except when sampling, said tube assembly designed for continuously aspirating two fluids simultaneously at different rates, one of said two fluids being aspirated at a higher rate being a diluent and the other of said two fluids being aspirated at a lesser rate being either said cleaning solvent, air or a viscous sample;

(b) inserting said tip of said tube assembly into a first container containing a non-diluted viscous sample;

(c) simultaneously inserting said operatively attached mixer blade into a second container containing a non-diluted viscous sample adjacent said first container;

(d) aspirating and diluting said viscous sample from said first container in said tip of said tube assembly; and

(e) simultaneously agitating said non-diluted viscous sample in said second container.

4,590,166

METHOD FOR SEPARATING AND MEASURING THE AMOUNT OF POLAR COMPOUNDS AND THEIR METABOLITES IN AQUEOUS SOLUTIONS

Robert I. Ellin, Baltimore, and Peter Zvirblis, Edgewood, both of Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Mar. 11, 1983, Ser. No. 477,479

Int. Cl.[4] G01N *1/18, 30/06, 33/48*

U.S. Cl. 436—96 21 Claims

1. A method for separating a polar compound selected from the group consisting of pyridostigmine, acetylcholine, neostigmine, and edrophonium and metabolites thereof from an aqueous solution comprising the steps of:

a. washing a cartridge which is packed with a packing material of silanized silica gel coated with octadecyl silane with an alkanol containing 1 to 7 carbon atoms, then washing said cartridge with water;

b. preparing an alkaline solution of said aqueous solution by adding a sufficient amount of base to said aqueous solution to adjust its pH level to within the range of 10 to 11;

c. recovering the alkaline solution prepared in step b.;

d. passing the alkaline solution recovered in step c. through said alkanol and water washed cartridge of step a. to cause said compound and metabolites thereof to bind to said packing material within the cartridge; and

e. separating the compound and metabolites thereof bound to the packing material within the cartridge of step d. by washing the cartridge with successive washings of water, an alkanol, and alkanol dilute acid-alkanol mixtures wherein the alkanol component contains 1 to 7 carbon atoms and collecting resultant liquid fractions containing said compound and metabolites.

4,590,167

THIN-LAYER CHROMATOGRAPHIC METHOD FOR THE SEPARATION OF ENANTIOMERS

Kurt Günther, Erlensee; Jürgen Martens, Alzenau, and Maren Schickedanz, Dietzenbach, all of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

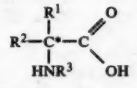
Filed Jul. 25, 1984, Ser. No. 634,685

Claims priority, application Fed. Rep. of Germany, Aug. 5, 1983, 3328348

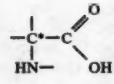
Int. Cl.[4] B01D *15/08*

U.S. Cl. 436—162 5 Claims

1. A method for the chromatographic separation of enantiomers of alpha-aminocarboxylic and alpha-iminocarboxylic acids of the general formula:



in which C* represents an asymmetry center and the substituents R^1, R^2 and R^3 are such that they provide the structural element,



derivatives of said carboxylic acids, either of which contains no free thiol group, which comprises carrying out a thin layer chromatographic separation of said enantiomers on a chromatographic plate, including ligand exchange with a chiral

stationary phase, said chromatographic plate being coated with silica gel made hydrophobic with a silane derivative and impregnated with an ionic compound of a divalent transition metal and a chiral selector and employing as the mobile phase in the chromatographic separation operation a ternary mixture containing water-miscible alkanol, water and acetonitrile or a quaternary mixture of a water-miscible alkanol, water, acetonitrile and a water-miscible cyclic ether.

4,590,168

PROTEIN IMMUNOASSAYING AND PURIFICATION

Arthur J. Sytkowski, Arlington, and Julia M. Sue, Brookline, both of Mass., assignors to The Children's Medical Center Corporation, Boston, Mass.

Filed Feb. 14, 1983, Ser. No. 466,204
Int. Cl.[4] G01N *33/543*; C07K *5/17*
U.S. Cl. 436—518 **15 Claims**

13. A method of immunoassay for erythropoietin comprising

(A) first incubating a mixture comprising

(1) a sample having an unknown amount of erythropoietin,

(2) an antibody raised to a polypeptide, or to said polypeptide linked to a carrier, wherein said polypeptide is an amino acid sequence of between 6 and 26 amino acids corresponding to an epitope of erythropoietin contained within the 26 N-terminal amino acids of erythropoietin, said antibody having the characteristic of separately binding both to erythropoietin and to said polypeptide, and

(3) a tracer comprising an amino acid sequence of between 6 and 26 amino acids corresponding to an epitope of erythropoietin contained within the 26 N-terminal amino acids of erythropoietin, said sequence being linked to a label, said tracer lacking a complete erythropoietin sequence, and then,

(B) determining the concentration of erythropoietin based on the amount of unbound tracer or tracer bound to said antibody.

4,590,169

DIRECT PARTICLE AGGLUTINATION IMMUNOASSAYS AVOIDING FALSE NEGATIVES AT HIGH ANTIGEN CONCENTRATIONS

Linda K. Cragle, San Diego; Paul C. Harris, Yorba Linda; Shih-Yun Lee, San Marcos; Ker-Kong Tung, Carlsbad, and Morton A. Vodian, Escondido, all of Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.

Filed Nov. 18, 1983, Ser. No. 553,209
Int. Cl.[4] G01N *33/543, 33/546, 33/555*
U.S. Cl. 436—523 **14 Claims**

1. A direct particle agglutination assay for an antigenic substance (Ag) in a fluid comprising:

(a) contacting said fluid with an antibody (Ab) coated particle (P) to agglutinate the Ab coated particles; and

(b) detecting the presence of agglutination; the improvement wherein said fluid is contacted with an additional entity comprising at least one different type of antibody (Ab_a) coated particle (P_1);

wherein:

(i) P_1 is selected from the group consisting of P, at least one different particle (P_2), and mixtures thereof (P and P_2);

(ii) each type of Ab_a-P_1 has a lower average affinity constant (K) for Ag than the K of Ab-P; and

(iii) said additional entity is present in an amount sufficient to avoid a high antigen false negative effect.

4,590,170

PROCESS FOR PREPARING MICROCAPSULE REAGENTS FOR IMMUNOLOGICAL RESPONSE

Yutaka Akiyoshi; Shinzo Kobayashi, both of Tokyo; Fujio Kakimi, and Hiroharu Matsukawa, both of Shizuoka, all of Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jul. 8, 1981, Ser. No. 281,529
Claims priority, application Japan, Jul. 9, 1980, 55-93407
Int. Cl.[4] G01N *33/547, 33/53*
U.S. Cl. 436—533 **13 Claims**

1. A process for producing a microcapsule reagent for passive agglutination which comprises binding an antigen or antibody onto an exterior wall surface of a microcapsule, which microcapsule comprises a wall material having encapsulated therein an oily substance as a core and which microcapsule has an average particle size of 0.1 to 30 microns and which microcapsule is negatively charged in an acidic solution.

4,590,171

LOW TEMPERATURE LEAD AND CADMIUM-FREE FRITS

Jaroslava M. Nigrin, Corning, N.Y., assignor to Corning Glass Works, Corning, N.Y.

Filed May 29, 1985, Ser. No. 738,860
Int. Cl.[4] C03C *8/06, 8/04, 3/118, 3/093*
U.S. Cl. 501—25 **2 Claims**

1. A frit essentially free from cadmium and lead demonstrating good glass stability, a coefficient of thermal expansion (20°–300° C.) between about $58–62\times10^{-7}$/°C., a softening point between about 600°–625° C., and excellent resistance to attack by acids found in foods and to attack by alkaline detergents, said frit consisting essentially, expressed in terms of weight percent on the oxide basis, of

Li_2O: 3–4
Na_2O: 0.75–3
BaO: 3.5–9.5
B_2O_3: 14–17.5
Al_2O_3: 6.75–8.75
SiO_2: 48–55
ZrO_2: 6.75–10.5
F: 3–4.

4,590,172

PREPARATION OF SOLUBLE MOLYBDENUM CATALYSTS FOR EPOXIDATION OF OLEFINS

Bruce H. Isaacs, Newtown Square, Pa., assignor to Atlantic Richfield Company, Los Angeles, Calif.

Filed Oct. 26, 1984, Ser. No. 665,422
Int. Cl.[4] B01J *23/28*
U.S. Cl. 502—160 **19 Claims**

1. In the method for producing a molybdenum-containing catalyst useful as an organic soluble epoxidation catalyst comprising reacting molybdenum metal with a peroxy compound in the presence of at least one saturated monohydroxy alcohol, the improvement which comprises effecting said reaction in the presence of an organic dicarboxylic acid present in an amount of at least 0.2 parts, by weight, per part of molybdenum metal, thereby resulting in a stable molybdenum-containing catalyst solution.

4,590,173

PROCESS FOR PRODUCING ANTIMONY-CONTAINING OXIDE CATALYST SUPPORTED ON SILICA FOR USE IN FLUIDIZED BED REACTION

Yutaka Sasaki; Toshio Nakamura; Hiroshi Utsumi; Hiroshi Murata, and Yoshimi Nakamura, all of Kanagawa, Japan, assignors to Nitto Chemical Industry Co., Ltd., Tokyo, Japan

Filed Feb. 7, 1985, Ser. No. 699,113

Claims priority, application Japan, Feb. 7, 1984, 59-19369

Int. Cl.[4] B01J *21/08, 23/16, 27/18*

U.S. Cl. 502—204 **8 Claims**

1. In a process for producing an antimony-containing oxide catalyst supported on silica for use in a fluidized bed reaction by the steps of preparing a slurry containing an antimony compound, a polyvalent metal compound, and a silica sol as the essential ingredients, heat treating the slurry at a pH of 7 or less and at a temperature of 40° C. or higher, and thereafter drying the slurry and calcining the dried particles, the improvement wherein said silica sol has a multi-peak particle size distribution profile that is derived by using a mixture of silica sol A in an amount corresponding to from 10 to 90 wt% of the total silica in the catalyst and silica sol B in an amount corresponding to 90 to 10 wt% of the total silica in the catalyst, with silica sols A and B having different average particle sizes, provided that the relations $3<da<100$ and $0.1<da/db<0.9$ are satisfied wherein da (mμ) is the average particle size of silica sol A, and db (mμ) is the average particle size of silica sol B.

2. A process according to claim 1, wherein a mixture of silica sols A and B is first prepared and then a slurry is prepared from the antimony compound, polyvalent metal compound, and said silica sol mixture.

8. A process according to claim 1, wherein the catalyst has a composition represented by the empirical formula

$$Me_aSb_bX_cQ_dR_eO_f(SiO_2)_g$$

wherein

Me represents at least one element selected from the group consisting of Fe, Co, Ni, Sn, U, Cr, Cu, Mn, Ti, Th, and Ce;

X represents at least one element selected from the group consisting of V, Mo, and W;

Q represents at least one element selected from the group consisting of Li, Na, K, Rb, Cs, Be, Mg, Ca, Sr, Ba, Y, La, Th, Zr, Hf, Nb, Ta, Re, Ru, Os, Rh, Ir, Pd, Pt, Ag, Zn, Cd, Al, Ga, In, Tl, Ge, Pb, As, and Se;

R represents at least one element selected from the group consisting of B, P, Te, and Bi; and the subscripts a, b, c, d, e, and g represents atomic ratios and are respectively within the ranges

a is from 5 to 15;

b is from 5 to 100;

c is from 0 to 15;

d is from 0 to 20;

e is from 0 to 10;

g is from 10 to 200; and

f refers to the number of oxygen atoms present in an oxide as formed by bonding the respective constituent elements.

4,590,174

OLEFIN METATHESIS CATALYST

Simon G. Kukes, and Robert L. Banks, both of Bartlesville, Okla., assignors to Phillips Petroleum Company, Bartlesville, Okla.

Division of Ser. No. 517,298, Jul. 26, 1983, Pat. No. 4,517,401. This application Sep. 11, 1984, Ser. No. 651,510

Int. Cl.[4] B01J *31/02, 27/14, 27/02, 27/06*

U.S. Cl. 502—219 **10 Claims**

1. A process for preparing a disporportionation catalyst comprising admixing a catalytically effective amount of a calcined and activated catalyst consisting essentially of at least one metal oxide selected from molybdenum oxide and tungsten oxide and a support containing a major proportion of silica or alumina with a promoting amount of a methylating agent selected from the group consisting of dimethyl sulfate, dimethylsulfoxide, trimethyloxonium tetrafluorborate, methyl iodide, and methyl bromide, and subjecting same to inert atmospheric conditions for said methylating agent to promote the activity of said calcined molybdenum and tungsten oxides for the disporportionation of olefins.

4,590,175

PROCESS FOR THE PRODUCTION OF ANTIMONY-CONTAINING METAL OXIDE CATALYSTS

Yutaka Sasaki; Hiroshi Utsumi; Kunio Mori; Hiroshi Yamamoto; Yoshimi Nakamura; Kiyoshi Moriya; Akimitsu Morii, all of Kanagawa; Mikio Noda, Tokyo, and Miki Kunitani, Kanagawa, all of Japan, assignors to Nitto Chemical Industry Co., Ltd., Tokyo, Japan

Filed Sep. 28, 1984, Ser. No. 655,612

Claims priority, application Japan, Sep. 28, 1983, 58-178314

Int. Cl.[4] B01J *21/08*

U.S. Cl. 502—249 **23 Claims**

1. A process for producing an antimony-containing metal oxide catalyst, wherein the antimony-containing metal oxide catalyst has the following empirical formula:

$$Me_aSb_bX_cQ_dR_eO_f(SiO_2)_g$$

wherein:

Me=at least one element selected from the group consisting of Fe, Co, Ni, Sn, U, Cr, Cu, Mn, Ti and Ce;

X=at least one element selected from the group consisting of V, Mo and W;

Q=at least one element selected from the group consisting of Li, Na, K, Rb, Cs, Be, Mg, Ca, Sr, Ba, Y, La, Zr, Th, Hf, Nb, Ta, Cr, Re, Ru, Os, Rh, Ir, Pd, Pt, Ag, Zn, Cd, Al, Ga, In, Tl, Ge, Pb, As and Se;

R=at least one element selected from the group consisting of B, P, Te and Bi; and

the subscripts a, b, c, d, e, f and g denote atomic ratios and are as follows:

a=5 to 15;

b=5 to 100;

c=0 to 15;

d=0 to 50;

e=0 to 10;

f=a number corresponding to the oxide formed when all the components are bound together; and

g=10 to 200, which process comprises

(1) preparing an aqueous slurry containing as essential componets an antimony component, one or more polyvalent metal compounds, and silica sol,

(2) heating and drying the slurry to form a solid product, and

(3) then calcining the solid product, wherein as the antimony component of step (1) a mixture of

(A) at least one of antimonic acid, polyantimonic acid and the salts thereof and

(B) antimony trioxide is used, the process comprises mixing (A) and (B) in such a manner that the antimony provided by the antimony trioxide constitutes from 0.1 to 70 atomic % of the total amount of antimony and further in an aqueous slurry state.

4,590,176

CATALYST FOR DIMETHYL ETHER SYNTHESIS AND A PROCESS FOR ITS PREPARATION

Arend Hoek, Amsterdam, Netherlands; Martin F. M. Post, Houston, Tex., and Johannes K. Minderhoud, Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.

Filed Apr. 5, 1985, Ser. No. 720,224

Claims priority, application Netherlands, Jun. 5, 1984, 8401790

Int. Cl.[4] B01J *21/04, 23/06, 23/26, 23/72*

U.S. Cl. 502—307 14 Claims

1. A process for the preparation of a catalyst mixture, which comprises mixing a dehydration catalyst with a composition comprising copper, zinc, chromium and/or aluminum, which composition has been obtained starting from an aqueous solution in which salts of the metals concerned are present in such quantities that in the solution the following requirements are met:

(a) the Cu/Zn atomic ratio is lower than 10,

(b) the (Cr+Al)/(Cu+Zn) atomic ratio is lower than 2, and

(c) the Cu/(Cu+Zn+Cr+Al) atomic ratio is higher than 0.1,

and adding to this solution at a temperature below about 55° C. and above about 15° C. a basic reacting substance to effect co-precipitation, followed by drying and calcining of the co-precipitate obtained.

4,590,177

METHOD FOR PREPARING DUAL COLLOID CATALYST COMPOSITIONS

Michael A. Richard, Fanwood; Thomas H. Vanderspurt, East Amwell Township, Hunterdon County, and Angelo A. Montagna, Summit, all of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Filed Aug. 10, 1984, Ser. No. 639,442

Int. Cl.[4] B01J *21/04, 23/78*

U.S. Cl. 502—328 41 Claims

1. A method for preparing amorphous catalyst precursor compositions containing one or more reducible phases and one or more nonreducible phases which method comprises:

(I) forming a gel, or colloidal suspension, by admixing, under sufficient agitation, (a) a 0.5 to 10M aqueous solution containing one or more soluble salts or complexes of one or more transition metals selected from Groups IB, IIB, VIB, VIIB, and VIII of the Periodic Table of the Elements, and wherein at least one of the transition metals is reducible and hydrolyzable, and one or more nonreducible elements selected from the group consisting of Cr, Al, Si, Th, U, the lanthanides and Sc, Y, Ti, Zr, Hf, V, Nb, and Ta, and elements of Groups IA and IIA of the Periodic Table of the Elements, with (b) a 0.5 to 10N aqueous base solution to cause the formation of a gel or colloidal suspension;

(II) separating the resulting solid precursor from the liquid phase of the admixture of (I) above;

(III) washing the precursor with water; and

(IV) drying the precursor.

4,590,178

AMINO ACID DERIVATIVES, METHODS OF PREPARING SAID DERIVATIVES AND ANTIHYPERTENSIVE DRUGS CONTAINING THEM

Shumpei Sakakibara, Suita; Yasumi Yugari, Kamakura, and Shigebumi Hashimoto, Yokohama, all of Japan, assignors to Ajinomoto Company, Incorporated, Tokyo, Japan

Continuation-in-part of Ser. No. 513,738, Jul. 14, 1983, Pat. No. 4,536,395, which is a continuation-in-part of Ser. No. 458,844, Jan. 18, 1983, Pat. No. 4,472,381. This application Mar. 16, 1984, Ser. No. 590,428

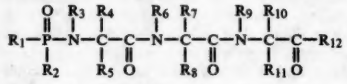
Claims priority, application Japan, Jan. 23, 1982, 57-9341; Aug. 16, 1982, 57-141831

The portion of the term of this patent subsequent to Sep. 18, 2001, has been disclaimed.

Int. Cl.[4] A61K *37/00;* C07C *103/52*

U.S. Cl. 514—18 14 Claims

1. A tripeptide represented by the formula:



wherein:

R_1 and R_2 are the same or different from each other, and each individually represents hydroxy, alkyloxy, aryloxy, aralkyloxy, alkyl, aryl, or aralkyl;

R_3 and R_{11} are hydrogen or alkyl;

R_5 is hydrogen;

R_8 is alkyl;

R_4, R_7, and R_{10}, at least two of which are the same, or all of which are different from one another, and each individually represents hydrogen, or substituted or unsubstituted alkyl, allyl, or aralkyl;

R_6 and R_9 are the same or different from each other, and each individually represents hydrogen, alkyl, aryl, or aralkyl;

R_{12} represents hydroxyl, alkyloxy, aryloxy, aralkyloxy, amino, mono- or di-alkyl, aryl, or aralkylamino; and

R_9 and R_{10} combined together represent a substituted or unsubstituted propylene bridge.

4,590,179

MEDICAMENTS CONTAINING AMINO-CYCLITOL DERIVATIVES

Fred R. Heiker; Lutz Müller; Walter Puls, and Hilmar Bischoff, all of Wuppertal, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Division of Ser. No. 369,761, Apr. 19, 1982, Pat. No. 4,526,784. This application Jan. 16, 1985, Ser. No. 692,100

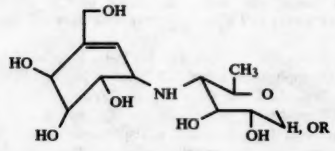
Claims priority, application Fed. Rep. of Germany, May 5, 1981, 3117705; Aug. 19, 1981, 3132691

The portion of the term of this patent subsequent to Jul. 2, 2002, has been disclaimed.

Int. Cl.[4] A61K *31/73*

U.S. Cl. 514—25 5 Claims

1. A pharmaceutical composition containing as an active ingredient an aminocyclitol derivative in crystalline form of the formula



in which

R denotes C_1–C_{30}-alkyl which is unsubstituted or substituted

by 1 to 5 substituents selected from hydroxyl, C_1–C_4-alkoxy, amino, mono- or di-alkylamino having 1 to 4 carbon atoms per alkyl radical, mercapto, C_1–C_4-alkylthio, halogen, C_1–C_4-alkylcarbonyl, carboxyl, nitro, cyano, the aldehyde function and a sulphonic acid group or a C_2–C_6-alkenyl group having 1 to 3 double bonds and optionally carrying 1 to 5 substituents selected from hydroxy, C_1–C_4-alkoxy, mercapto, C_1–C_4-alkylthio, halogen and nitro, and in which the symbol "H, OR" indicates that both possible stereoisomeric formulae are included in amount effective for treating adiposity, in admixture with an inert pharmaceutical carrier.

4,590,180

USE OF ADENOSINE DERIVATIVES AS PSYCHOPHARMACOLOGICAL AGENTS

Klaus Irmscher; Rochus Jonas, both of Darmstadt; Jürgen Uhl, Seeheim, and Ernst Schorscher, Darmstadt, all of Fed. Rep. of Germany, assignors to Merck Patent Gesellschaft mit beschränkter Haftung, Darmstadt, Fed. Rep. of Germany

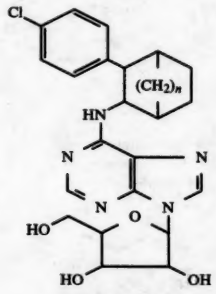
Continuation-in-part of Ser. No. 265,489, May 20, 1981, abandoned. This application Apr. 22, 1983, Ser. No. 487,645

Claims priority, application Fed. Rep. of Germany, May 21, 1980, 3019322

Int. Cl.⁴ A61K *31/70;* **C07H** *19/167*

U.S. Cl. 514—46 **25 Claims**

1. A method of achieving a CNS-depressant effect in a patient suffering from an indication which can be treated by achieving such an effect, which comprises administering to such a patient an amount of a compound of the formula



wherein n is 1 or 2 or a physiologically acceptable acid addition salt thereof, effective to achieve said CNS-depressant effect in the patient which relieves the indication.

4,590,181

SYNTHETIC IMMUNOREGULATORS AND METHODS OF USE AND PREPARATION

Robert E. McCarthy, Omaha, Nebr., assignor to Board of Regents of the University of Nebraska, Lincoln, Nebr.

Filed Dec. 20, 1982, Ser. No. 451,016

Int. Cl.⁴ A61K *31/715, 39/12;* **C07H** *1/00;* **C08B** *37/02*

U.S. Cl. 514—54 **4 Claims**

1. A composition adaptable for use as an injectable solution which comprises:

a viral antigen and

an adjuvant consisting essentially of a polysaccharide having a molecular weight from about 10,000 to 600,000 selected from the group consisting of pustulan and mycodextran wherein said polysaccharide has at least two anionic chemical groups attached thereto, which adjuvant stimulates a cell-mediated immune response to said viral antigen without stimulating other immune responses.

4. A method of immunizing a subject against a viral antigen comprising innoculating the subject with a polysaccharide having a molecular weight between 10,000 and 600,000 selected from the group consisting of pustulan and mycodextran wherein said polysaccharide has at least two anionic chemical groups attached thereto, which adjuvant stimulates a cell-mediated immune response to said viral antigen without stimulating other immune respones.

4,590,182

ORGANOPHOSPHORUS COMPOUND AND INSECTICIDAL, MITICIDAL OR NEMATICIDAL COMPOSITION CONTAINING IT

Takahiro Haga, Kusatsu; Tadaaki Toki, Otsu; Toru Koyanagi, Kyoto; Hiroshi Okada, Kusatsu; Kiyomitsu Yoshida, Kusatsu, and Osamu Imai, Kusatsu, all of Japan, assignors to Ishihara Sangyo Kaisha Ltd., Osaka, Japan

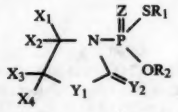
Filed Nov. 7, 1984, Ser. No. 668,938

Claims priority, application Japan, Nov. 11, 1983, 58-212068; Dec. 23, 1983, 58-243485; Aug. 28, 1984, 59-179065; Sep. 7, 1984, 59-187755; Sep. 11, 1984, 59-190344

Int. Cl.⁴ A01N *57/32;* **C07F** *9/65*

U.S. Cl. 514—80 **13 Claims**

1. An organophosphorus compound represented by the general formula:



(I)

where each of X_1 and X_3 is a hydrogen atom; an alkyl or alkoxy group which may be substituted by halogen, alkoxy, alkylthio, phenoxy, halogenated phenoxy, phenylthio or halogenated phenylthio; a carboxyl group; an alkoxycarbonyl group; or a phenyl group which may be substituted by halogen, each of X_2 and X_4 is a hydrogen atom or an alkyl group, provided that X_2 and X_3 may together form an alkylene group, each of Y_1, Y_2 and Z is an oxygen atom or a sulfur atom, and each of R_1 and R_2 is an alkyl group.

13. An insecticidal, miticidal or nematicidal composition comprising an insecticidally, miticidally or nematicidally effective amount of an organophosphorus compound of the formula I as defined in claim 1 and, a carrier.

4,590,183

GASTRIC CYTOPROTECTION WITH SODIUM THIOSULFATE IN ORAL ADMINISTRATION OF ASPIRIN

Denis M. Bailey, East Greenbush, N.Y., assignor to Sterling Drug Inc., New York, N.Y.

Filed Apr. 22, 1985, Ser. No. 725,447

Int. Cl.⁴ A61K *31/61*

U.S. Cl. 514—163 **20 Claims**

1. The method of providing cytoprotection of the gastric mucosa in a mammal receiving aspirin perorally which comprises orally administering either prior to or in combination with aspirin a cytoprotectively effective amount of sodium thiosulfate, using at least about 0.15 part of sodium thiosulfate per part by weight of aspirin.

4,590,184
ANTIOSTEOPOROTIC PHARMACEUTICAL COMPOSITION CONTAINING 24,25-DIHYDROXYCHOLECALCIFEROL AS AN ACTIVE INGREDIENT

Yuji Maeda, Nagareyama; Hideyuki Yamato, Tokyo; Takayoshi Fujii, Tokyo; Yasuhiko Kobayashi, Tokyo; Kenichi Saito, Tokyo; Tadaaki Kato, Tokyo, and Chikao Yoshikumi, Kunitachi, all of Japan, assignors to Kureha Kagaku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 18, 1984, Ser. No. 662,044

Claims priority, application Japan, Oct. 24, 1983, 58-198454

Int. Cl.[4] A61K *31/59*

U.S. Cl. 514—167 **2 Claims**

1. A method for the treatment of osteoporosis, which comprises administering to a patient suffering from osteoporosis an effective amount of a compound of 24,25-dihydroxycholecalciferol.

4,590,185
3-AZINOMETHYL RIFAMYCINS

Leonardo Marsili; Marco Falciani, and Renato Broggi, all of Milan, Italy, assignors to DOBFAR S.p.A., Milan, Italy

Filed Apr. 1, 1985, Ser. No. 718,085

Claims priority, application United Kingdom, Apr. 6, 1984, 8408924

Int. Cl.[4] A61K *31/395*; C07D *498/08*

U.S. Cl. 514—183 **10 Claims**

1. 3-azinomethyl rifamycin having the formula (I):

(I)

wherein

R represents hydrogen or acetyl;

R_1 represents hydrogen or lower alkyl;

R_2 represents an alkyl group having from 2 to 4 carbon atoms substituted by a dialkoxy group each having from 1 to 3 carbon atoms;

R_3 represents an alkyl group having from 1 to 4 carbon atoms;

R_2 and R_3 may form with the amino nitrogen atom a 4- to 8-membered saturated heterocyclic ring, having a maximum of two nitrogen atoms, wherein when there are two nitrogen atoms in said heterocyclic ring, there are no nitrogen-nitrogen bonds in said heterocyclic ring, and further wherein said heterocyclic ring is substituted by hydroxy-, alkoxy-, dialkoxy- or alkylenedioxy groups each having from 1 to 4 carbon atoms, arylalkoxyimino groups having from 7 to 9 carbon atoms, acyloxy groups of carboxylic acids having from 1 to 4 carbon atoms;

R_1 and R_2 may form with the amino nitrogen atom and the carbon atom a 5 to 7-membered saturated heterocyclic ring, said amino nitrogen being the only hetero atom, optionally substituted by alkyl or alkoxy group having from 1 to 4 carbon atoms.

10. An antibiotic composition which comprises a 3-azinomethyl-rifamycin as claimed in claim **1** in an amount sufficient to exert antibacterial activity and a pharmaceutically acceptable carrier or diluent thereof.

4,590,186
CEPHEM COMPOUNDS HAVING 3-BICYCLIC HETEROCYCLIC CATION GROUPS

Takao Takaya; Kazuo Sakane, both of Kawanishi, and Hideaki Yamanaka, Hirakata, all of Japan, assignors to Fujisawa Pharmaceutical Co., Ltd., Osaka, Japan

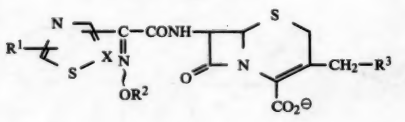
Filed Jan. 10, 1985, Ser. No. 690,251

Claims priority, application United Kingdom, Jan. 16, 1984, 8401093

Int. Cl.[4] A61K *31/545*; C07D *501/46*

U.S. Cl. 514—202 **6 Claims**

1. A cephem compound of the formula:

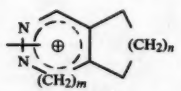


wherein

R^1 is amino or protected amino,

R^2 is lower aliphatic hydrocarbon group,

R^3 is a group of the formula:



wherein

m is 0 or 1, and

n is 1 or 2,

which may have a lower alkyl substituent at the N atom, and X is CH or N,

and pharmaceutically acceptable salts thereof.

4,590,187
PHOSPHOLIPASE A_2 INHIBITION USING 4,1-BENZOXAZEPINE-2-(3H)-ONES

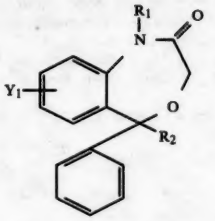
Donald P. Wallach, deceased, late of Richland, Mich. (by Vera Wallach, legal representative); Donald E. Ayer, and Jacob Szmuszkovicz, both of Kalamazoo, Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Continuation-in-part of Ser. No. 552,996, Nov. 17, 1983, abandoned, and Ser. No. 552,997, Nov. 17, 1983, abandoned. This application Dec. 19, 1984, Ser. No. 683,539

Int. Cl.[4] A61K *31/55*; C07D *267/14*

U.S. Cl. 514—211 **10 Claims**

1. A compound of the Formula I



wherein R_1 is
(a) cyclopropylmethyl,
(b) 2-phenylethyl,
(c) $-(CH_2)_n-NR_4R_5$, or
(d) $-CH_2-CH_2-(CH_2)_m-R_{11}$,
wherein R_{11} is
(a) $-O-PhX$,
(b) $-S(O)_n-PhX$,
(c) $-O-Z$,
(d) $-PhX$,
(e) $-OR_2$, or
(f) phthalimido;
wherein PhX is
(a) phenyl, or
(b) phenyl substituted by X_1;
wherein X_1 is
(a) chloro
(b) bromo
(c) fluoro,
(d) nitro,
(e) trifluoromethyl,
(f) methoxy,
(g) hydroxy,
(h) (C_1-C_3)alkyl,
(i) $-SCH_3$, or
(j) $-CO_2M$, wherein M is hydrogen, (C_1-C_3)alkyl, or a pharmacologically acceptable cation;
wherein n is 2 or 3, wherein m is an integer from zero to 4, inclusive, with the proviso that m is not zero when R_{11} is phenyl; wherein p is an integer from zero to 2, inclusive, and wherein R_4 and R_5 are the same or different and are (C_1-C_3)alkyl or R_4 and R_5 together with the nitrogen atom to which they are attached from 1-azetidinyl, 1-pyrrolidinyl, 1-piperidinyl, or 4-morpholinyl; wherein R_2 is
(a) hydrogen,
(b) (C_1-C_3)alkyl,
(c) phenyl;
wherein Z is (C_3-C_6)cycloalkyl; wherein Y_1 is
(a) hydrogen,
(b) chloro,
(c) bromo,
(d) fluoro,
(e) nitro, or
(f) trifluoromethyl,
including the acid addition salts thereof when R_1 is $-(CH_2)_n-NR_4R_5$; with the following provisos:
(1) when R_1 is cyclopropylmethyl and R_2 is methyl or when R_1 is $-CH_2-CH_2-(CH_2)_m-R_{11}$, Y_1 is not hydrogen,
(2) when R_1 is cyclopropylmethyl, 2-phenylethyl, or $-(CH_2)_n-NR_4R_5$, Y_1 is not nitro, and
(3) R_2 is hydrogen or (C_2-C_3)alkyl only when R_1 is $-CH_2-CH_2-(CH_2)_m-R_{11}$.

10. A method for treating or preventing phospholipase A_2-mediated conditions (PMC) in a mammal susceptible to said PMC which comprises:
administering to said mammal an amount effective to inhibit phospholipase A_2 of a compound of claim **1**.

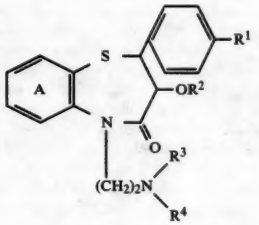
4,590,188

1,5-BENZOTHIAZEPINE DERIVATIVES AND THEIR PHARMACEUTICAL USE

Mikio Takeda, Urawa; Tokuro Oh-ishi, Tokyo; Hiromichi Nakajima, Urawa, and Taku Nagao, Tokyo, all of Japan, assignors to Tanabe Seiyaku Co., Ltd., Japan

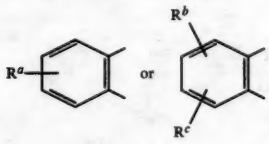
Filed Feb. 4, 1985, Ser. No. 698,125
Claims priority, application United Kingdom, Feb. 18, 1984, 8404324; Feb. 18, 1984, 8404325; Mar. 10, 1984, 8406318
Int. Cl.[4] A61K *31/55;* **C07D** *281/10*
U.S. Cl. 514—211 **15 Claims**

1. A 1,5-benzothiazepine of the formula:



(I)

wherein R^1 is lower alkyl or lower alkoxy, R^2 is lower alkanoyl, each one of R^3 and R^4 is lower alkyl, Ring A is a substituted benzene ring of the formula:



R^a is lower alkyl or lower alkoxy, and each one of R^b and R^c is lower alkyl or a pharmaceutically acceptable acid addition salt thereof.

12. A pharmaceutical composition possessing hypotensive, cerebral vasodilating or coronary vasodilating activity which comprises a therapeutically effective amount of a compound according to claim **1** and a pharmaceutically acceptable carrier therefor.

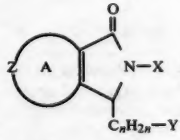
4,590,189

CONDENSED PYRROLINONE DERIVATIVES, THEIR PRODUCTION AND USE

Kentaro Hiraga, Nagaokakyo, and Yoshiaki Saji, Kawanishi, both of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan

Filed Mar. 24, 1983, Ser. No. 478,478
Claims priority, application PCT Int'l Appl., Apr. 2, 1982, 82/00096; Oct. 7, 1982, 82/00401; Feb. 5, 1983, 83/00032
Int. Cl.[4] C07D *413/02, 403/04, 401/02, 471/04, 209/02;* **A61K** *31/535, 31/505, 31/495, 31/47, 31/40*
U.S. Cl. 514—212 **13 Claims**

1. A compound of the formula:



wherein X is a cyclic group of the class consisting of phenyl,

naphthyl, pyridyl, pyridazinyl, pyrazinyl, pyrimidinyl, quinolyl, naphthyridinyl, thiazolyl, benzothiazolyl or C_{3-7}cycloalkyl, which cyclic group is attached through a carbon atom thereof and is unsubstituted or substitued by 1 to 3 substituents of the class consisting of halogen, C_{1-4}alkyl, C_{1-4}alkoxy, methylenedioxy, phenoxy, benzyloxy, hydroxy, C_{2-5}alkanoyloxy, amino, di-C_{1-4}alkylamino, ω-hydroxy-C_{1-3}alkyl, C_{2-5}alkanoyl, benzoyl, amido, nitro, cyano, trifluoromethyl, C_{1-4}alkylthio, C_{2-5}alkanoyloxy-C_{1-3}alkyl, C_{2-5}alkanoylamino, methoxycarbonyl and ethoxycarbonyl;

wherein Y is COOH, $COOR^1$ or $—CO—NR^2R^3$, wherein R^1 is C_{1-4}alkyl, phenyl-C_{1-4}alkyl or phenyl, and wherein R^2 and R^3 are the same or different members of the class consisting of hydrogen, C_{1-4}alkyl, phenyl-C_{1-4}alkyl, phenyl, thiazolyl or benzothiazolyl, which are unsubstituted or substituted by halogen, hydroxy, C_{1-4}alkoxy, C_{2-5}alkoxycarbonyl or di-C_{1-4}alkylamino, or wherein NR^2R^3 is a cyclic group of the class consisting of pyrrolidinyl, piperidino, hexahydroazepinyl, piperazinyl, morpholino or thiazolidinyl, which cyclic group is unsubstituted or substituted by 1 or 2 members of the class consisting of hydroxy, C_{1-4}alkoxy, C_{1-4}alkyl, C_{2-5}alkoxycarbonyl, phenyl-C_{1-4}alkyl, phenyl, piperidino, and pyridyl;

wherein Z is $—CH=CH—CH=CH—$ or $—(CH_2)_m—$, m being an integer of 3 to 5 inclusive;

ring A is unsubstituted or substituted by 1 or 2 substituents of the class consituting of halogen, nitro, amino, C_{2-5}alkanoylamino, C_{2-5}alkoxycarbonyl, carboxy and carbamoyl; and

n is an integer of 1 to 3 inclusive, provided that when n is 2 or 3, group X and ring A are unsubstituted,

or pharmaceutically acceptable salts thereof.

4,590,190

METHOD FOR PERCUTANEOUSLY ADMINISTERING PHYSIOLOGICALLY ACTIVE AGENTS USING AN ALCOHOL ADJUVANT AND A SOLVENT

Kenichiro Saito, Menlo Park; Jorge Heller, Woodside, and Wilfred A. Skinner, Portola Valley, all of Calif., assignors to Nitto Electric Industrial Co., Ltd., Japan

Filed Jul. 1, 1983, Ser. No. 510,133

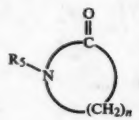
Int. Cl.[4] A61K *31/55*

U.S. Cl. 514—221 **9 Claims**

1. A method for percutaneously administering a benzodiazepine to a mammal which comprises applying the benzodiazepine to the skin of the mammal in a mixture comprising at least one of the following Components A and at least one of the following Components B:

Component A: an aliphatic monoalcohol having from 10 to 26 carbon atoms and mixtures thereof having a melting point less than 38° C.;

Component B: a compound represented by the formula:



wherein R_5 represents a hydrogen atom or a lower alkyl group having 1 to 4 carbon atoms and n represents an integer of 3 to 5, wherein the benzodiazepine is present in an amount of 0.01 to 50% by weight based on the total amount of Component A and Component B, and wherein the amount of Component A is from 0.1 to 80% by weight based on the total weight of Component A and Component B.

4,590,191

SOPORIFIC CONTAINING LORAZEPAM

Josef O. Widauer, Allschwil, Switzerland, assignor to Medichemie AG, Ettingen, Switzerland

Filed Dec. 3, 1984, Ser. No. 677,698

Claims priority, application Fed. Rep. of Germany, Feb. 8, 1984, 3404316

Int. Cl.[4] A61K *31/55, 31/135*

U.S. Cl. 514—221 **1 Claim**

1. A soporific consisting essentially of:

lorazepam,

diphenhydramine or a pharmaceutically acceptable acid addition salt thereof; and

an effective amount of non-pharmacologically active pharmaceutical carrier material,

wherein the ratio by weight of lorazepam to diphenhydramine or pharmaceutically acceptable acid addition salt thereof is 1:25.

4,590,192

BENZISOTHIAZOLES, THEIR PHARMACEUTICAL COMPOSITIONS, AND METHOD OF USE

Charles S. Fake, and Gordon Burrell, both of Harlow, England, assignors to Beecham Group p.l.c., Brentford, England

Filed Sep. 29, 1983, Ser. No. 537,048

Claims priority, application United Kingdom, Oct. 1, 1982, 8228150; Jul. 28, 1983, 8320326

Int. Cl.[4] A61K *31/38;* C07D *417/12*

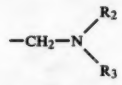
U.S. Cl. 514—231 **18 Claims**

1. A compound of formula (I) or a pharmaceutically acceptable salt, a compound of formula (I) quaternized by an optionally substituted alkyl halide selected from the group consisting of C_{1-4} alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkyl C_{1-4} alkyl or phenyl C_{1-4} alkyl halide, N-oxide of the NH-Het moiety of formula (I) or hydrate thereof:

$$R_1—Ar—(CH_2)_a—X—(CH_2)_b—NH—Het \quad (I)$$

wherein:

R_1 is hydrogen, halogen, hydroxy, C_{1-4} alkyl, C_{1-4} alkoxy, or amino or guanidino, the or any amino moiety being optionally substituted by one or two C_{1-4} alkyl optionally substituted by halogen, or an aminomethylene group of formula (a),



(a)

in which R_2 and R_3 are the same or different and are hydrogen, C_{1-4} alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkyl C_{1-4} alkyl or phenyl C_{1-4} alkyl, or R_2 and R_3 L together with the nitrogen atom to which they are attached are morpholino, pyrrolidino or piperidino;

Ar is furandiyl, thiophendiyl, phenylene, thiazolediyl or thiadiazolediyl;

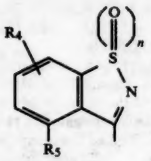
a is 0 or an integer 1 or 2;

X is —S—, —O—, $—CH_2—$,

or —NH—;

b is an integer from 2 to 5; and

Het is bicyclic heteroaryl group of formula,



in which R_4 is hydrogen and R_5 is hydrogen, halogen, C_{1-6} alkyl, trifluoromethyl, nitro, cyano, hydroxy, C_{1-6} alkoxy, C_{1-6} alkylthio, carboxy, amino, aminocarbonyl, aminocarbonylamino, amino-thiocarbonylamino, aminosulphonyl, C_{1-6} alkylsulphonyl, C_{1-6} alkylsulphinyl, C_{1-6} alkylsulphonylamino, C_{1-6} alkylsulphinylamino, phenylsulphonyl, phenylsulphinyl or a group of formula (d) or (e),

$$R_6—CY— \quad (d)$$

$$R_6—CY—Z— \quad (e)$$

in which R_6 is hydrogen, C_{1-6} alkyl, C_{1-6} alkoxy, C_{1-6} alkylthio, phenyl, phenoxy or phenylthio, Y is oxygen or sulphur and Z is oxygen, sulphur or N—R_7, R_7 being hydrogen or C_{1-6} alkyl, the C_{1-6} alkyl group or the C_{1-6} alkyl moiety of any of the foregoing C_{1-6} alkyl-containing groups for R_5 being optionally substituted by phenyl, the amino group or the amino moiety of any of the foregoing amino-containing groups for R_5 being optionally substituted by one or two C_{1-6} alkyl, phenyl or phenyl-C_{1-4} alkyl or optionally N-disubstituted by C_{4-5} polymethylene, and the phenyl moiety of any of the foregoing phenyl-containing groups for R_5 being optionally substituted by C_{1-6} alkyl, C_{1-6} alkoxy, halogen, nitro or trifluoromethyl, and n is 0 or an integer 1 or 2.

18. A method of treating or preventing disorders in mammals such as humans caused or exacerbated by excess gastric acid secretion, such as peptic ulcer, comprising administering to a mammal a pharmaceutically effective amount of a compound of formula (I), as defined in claim **1**, or a pharmaceutically acceptable salt, a compound of formula (I) quaternized by an optionally substituted alkyl halide selected from the group consisting of C_{1-4} alkyl, C_{3-6} cycloalkyl, C_{3-6} cycloalkyl C_{1-4} alkyl or phenyl C_{1-4} alkyl halide, N-oxide of the NH-Het moiety of formula (I) or hydrate thereof.

4,590,193

3-(2-(4-PHENYLPIPERAZINYLETHYL)ANILINO)-ISOBENZOFURANONES, THEIR METHOD OF PREPARATION AND THEIR USE AS ANTIHYPERTENSIVE AND ANTIALLERGIC DRUGS

Marie-Hélène Creuzet, Bordeaux; Claude Feniou, Pessac; Francoise Guichard, Bordeaux; Gisèle Prat, Talence, and Henri Pontagnier, Pessac, all of France, assignors to Societe Cortial, S.A., Paris, France

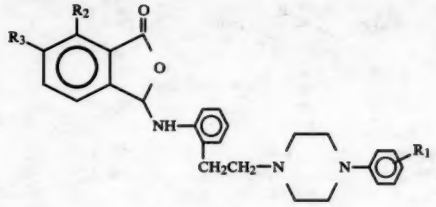
Filed Jul. 27, 1983, Ser. No. 517,653

Claims priority, application France, Jul. 29, 1982, 82 13446

Int. Cl.[4] **A61K** *31/495;* **C07D** *241/04*

U.S. Cl. 514—253 **17 Claims**

1. The compound of the formula



wherein:

R_1, may be one or more substituents located at the ortho, meta or para positions, and represents a radical selected from the group consisting of H, CH_3, CF_3, F, Cl and OCH_3; and

R_2 and R_3, may be the same or different, and represent H or OCH_3; or pharmaceutically acceptable addition salts thereof.

5. A pharmaceutical composition useful for treating a condition selected from the group consisting of allergies, hypertension, uriticaria, pruritus, dermatosis, eczema, hay fever, Quincke's edema, serum sickness, asthma and anaphylactic shock, comprising:

an effective amount of one of the compounds of claim **1**, or a combination thereof; and a pharmaceutically safe excipient.

6. The pharmaceutical composition of claim **5** wherein the excipient is suitable for the oral administration of said composition.

4,590,194

3-[METHYL OR DIMETHYL)AMINO]-6-(PYRIDINYL)PYRIDAZINES AND THEIR CARDIOTONIC USE

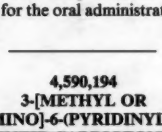
George Y. Lesher, Schodack, and William B. Dickinson, Albany, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.

Filed Oct. 5, 1981, Ser. No. 308,413

Int. Cl.[4] **A61K** *31/44;* **C07D** *213/84, 213/74*

U.S. Cl. 514—247 **7 Claims**

1. A 3-(NB)-4-Q-6-PY-pyridazine having the formula



or acid-addition salt thereof, where PY is 4- or 3-pyridinyl or 4- or 3-pyridinyl having one or two lower-alkyl substituents where each lower-alkyl has from one to six carbon atoms which can be arranged as straight or branched chains and Q is cyano when NB is $NHCH_3$ or $N(CH_3)_2$, or Q is carbamyl when NB is NHCH3, or Q is hydrogen when NB is $N(CH_3)_2$.

4,590,195

4-ARYL-3,5-BIS(ALKOXYCARBONYL)-6-METHYL-2-AMINOALKYLOXYMETHYL-1,4-DIHYDROPYRIDINE ANTIHYPERTENSIVE AGENTS

David Alker, Eastry, Nr. Deal; Peter E. Cross, Canterbury, and Simon F. Campbell, Deal, all of England, assignors to Pfizer Inc., New York, N.Y.

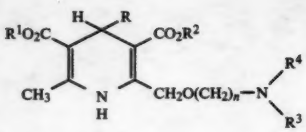
Filed Mar. 5, 1984, Ser. No. 586,514

Claims priority, application United Kingdom, Mar. 10, 1983, 8306666

Int. Cl.[4] **C07D** *401/12, 211/82, 213/55;* **A61K** *31/495, 31/44*

U.S. Cl. 514—252 **6 Claims**

1. A 1,4-dihydropyridine compound having the formula:

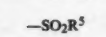


wherein R is 2,3-dichlorophenyl;

R^1 and R^2 are each independently C_1–C_4 alkyl;

n is 2; R^3 is H or C_1–C_4 alkyl; and

R_4 is a group of the formula



wherein

R^5 is 2-chloropyrid-5-yl or 2-(4-methylpiperazin-1-yl)pyrid-5-yl and a pharmaceutically acceptable acid addition salt thereof.

6. A method for treating hypertension in a mammal comprising administering to said mammal an antihypertensive effective amount of a compound according to claim 1 or 5.

4,590,196

ANALGESIC 1,2-BENZISOTHIAZOL-3-YLPIPERAZINE DERIVATIVES

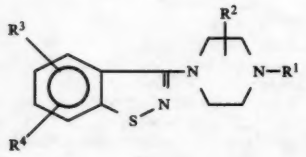
David W. Smith, Evansville, and Joseph P. Yevich, Newburgh, both of Ind., assignors to Bristol-Myers Company, New York, N.Y.

Filed Aug. 23, 1984, Ser. No. 643,614

Int. Cl.[4] C07D *417/04;* A61K *31/495*

U.S. Cl. 514—253 **26 Claims**

1. A compound of Formula I



I

wherein

R^1 is hydrogen, lower (C_{1-6}) alkyl, either straight chain or branched, lower alkenyl, lower cycloalkyl, lower cycloalkyl-lower alkylene, phenyl-lower alkylene, phenoxy-lower alkylene, phenyl-lower cycloalkyl, or benzodioxan-2-yl-lower alkylene; with the proviso that R^1 is not hydrogen when R^2 and R^3 are hydrogen and R^4 is hydrogen or halogen;

R^2 is lower alkyl or hydrogen; and

R^3 and R^4 are independently chosen from hydrogen, lower alkyl, lower acyloxy, lower alkoxy, lower alkylthio, halogen, hydroxyl, or trifluoromethyl;

or a pharmaceutically acceptable acid addition salt thereof.

4,590,197

9,10-SUBSTITUTED 2-MESITYLIMINO-3-ALKYL-3,4,6,7-TETRA-HYDRO-2H-PYRIMIDO(6,1-a)ISOQUINOLIN-4-ONES, AND THEIR USE AS MEDICAMENTS

Bansi Lal; Alihussein N. Dohadwalla; Vijay A. Aroskar; Nandkumar K. Dadkar, all of Bombay, India; Horst Dornauer, Kelkheim, Fed. Rep. of Germany; Julius Mascarenhas, and Noel J. deSouza, both of Bombay, India, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

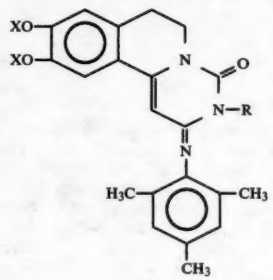
Continuation of Ser. No. 415,837, Sep. 8, 1982, abandoned. This application May 7, 1984, Ser. No. 607,718

Claims priority, application Fed. Rep. of Germany, Sep. 10, 1981, 3135831

Int. Cl.[4] A61K *31/505;* C07D *471/04*

U.S. Cl. 514—267 **8 Claims**

1. A compound of the formula



or a pharmceutically acceptable salt thereof where R is (C_1–C_4)-alkyl and one of X and Y is (C_1–C_4)-alkyl and the other is

wherein R^1, R^2, and R^3, taken alone, are the same or different and are hydrogen or (C_1–C_4)-alkyl, or R^2 and R^3, taken together with the nitrogen atom to which they are bound, are piperazino, piperidino, or piperazino or piperidino substituted by (C_1–C_4)-alkyl, (C_2–C_5)-carboalkoxy, pyridyl, phenyl, or phenyl mono-, di-, or tri-substituted by halogen, hydroxyl, methyl, ethyl, methoxy, nitro, or trifluoromethyl.

7. A pharmaceutical composition for the treatment of hypertension comprising an antihypertensively effective amount of a compound as in claim 1 in admixture or conjunction with a pharmaceutically suitable carrier.

8. A method for treating high blood pressure in a patient suffering therefrom which comprises administering a said patient an antihypertensively effective amount of a compound as in claim 7.

4,590,198

FUNGICIDAL ISONICOTINANLLIDE RETALS, THEIR COMPOSITIONS AND METHOD OF USING THEM

Hiroshi Sugiyama, Tokyo; Keizo Hosoda, Shizuoka; Masanori Okada, Saitama; Yoshitaka Iwane, Kanagawa, and Yasushi Murakami, Tokyo, all of Japan, assignors to Chugai Seiyaku Kabushiki Kaisha, Tokyo, Japan

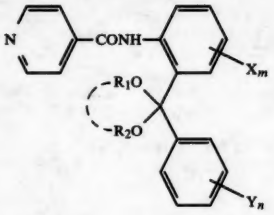
Filed Feb. 7, 1984, Ser. No. 578,048

Claims priority, application Japan, Feb. 24, 1983, 58-29929; Apr. 28, 1983, 58-73865; Sep. 30, 1983, 58-180774

Int. Cl.[4] A61K *31/455;* C07D *213/81*

U.S. Cl. 514—336 **22 Claims**

1. A ketal compound of the formula:



wherein X is a halogen atom, a trifluoromethyl group or a lower alkyl group; Y is a halogen atom, a lower alkyl group or a lower alkyloxy group; m and n each independently are an integer of 0 to 2, and when m or n is 2, the plurality of each of X or Y may have the same or different meanings; R_1 and R_2 independently represent a lower alkyl, allyl or propargyl group, or R_1 and R_2 together form a branched or unbranched lower alkylene chain which, when taken together with

to which they are attached, form a ring structure.

4,590,199

ANTIHISTAMINIC 2-(AMINO ETHYLAMINO) PYRIDINES

Geoffrey G. Coker, 80 Pickhurst Park, Bromley, Kent, England, and John W. A. Findlay, Rte. 2, Box 514, Cascade Dr., Chapel Hill, N.C.

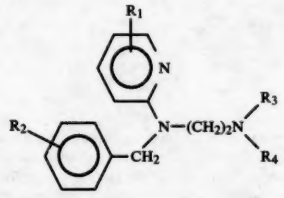
Filed Jul. 27, 1984, Ser. No. 635,308

Claims priority, application United Kingdom, Aug. 1, 1983, 8320699

Int. Cl.[4] A61K *31/455, 31/44;* **C07D** *401/12, 213/80*

U.S. Cl. 514—343 **15 Claims**

1. A compound of the formula (I):



(I)

or a pharmaceutically acceptable salt thereof; wherein R_1 is —COOH, —CH=CH—COOH, —CH_2COOH, or $(CH_2)_2$COOH, R_2 is alkoxy (1–4 carbons), alkyl (1–4 carbons), hydrogen, or halogen, R_3 and R_4 may be the same or different and can be hydrogen, or lower alkyl (1–4 carbons) or NR_3R_4 is pyrrolidino.

4,590,200

NAPHTHALENE THROMBOXANE SYNTHETASE INHIBITORS

Peter E. Cross, Canterbury, and Roger P. Dickinson, Dover, both of England, assignors to Pfizer Inc., New York, N.Y.

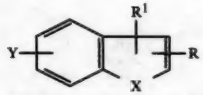
Division of Ser. No. 406,140, Aug. 9, 1982, Pat. No. 4,496,572. This application Oct. 22, 1984, Ser. No. 663,244

Claims priority, application United Kingdom, Aug. 26, 1981, 8125976

Int. Cl.[4] C07D *213/06;* **A61K** *31/435*

U.S. Cl. 514—357 **6 Claims**

1. A compound of the formula:



or a pharmaceutically acceptable salt thereof, wherein

R^1 is hydrogen, F, Cl, Br, I, C_1–C_4 alkyl or —S(C_1–C_4 alkyl);

Y is —COOH, —COO(C_1–C_4 alkyl) or —$CONH_2$;

X is —CH=CH—; and

R is 1-imidazolylmethyl or (3-pyridyl)—Z—

wherein Z is —CH_2—, —CH=CH—, —OCH_2—, —CO— or —S—.

4,590,201

5-AMINO OR SUBSTITUTED AMINO 1,2,3-TRIAZOLES

Richard J. Bochis, East Brunswick; John C. Chabala, Westfield, and Michael H. Fisher, Ringoes, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.

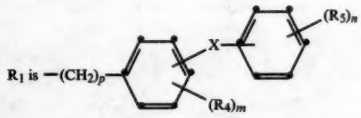
Filed Feb. 2, 1984, Ser. No. 576,301

Int. Cl.[4] C07D *249/06;* **A01N** *43/36*

U.S. Cl. 514—359 **15 Claims**

1. A compound having the formula:

wherein:



wherein p is 0 to 2; m is 0 to 4; and n is 0 to 5; X is O, S, SO, SO_2, CO, CHCN, CH_2 or C=NR_6 where R_6 is hydrogen, loweralkyl, hydroxy, loweralkoxy, amino, loweralkylamino, diloweralkylamino or cyano; and,

R_4 and R_5 are independently halogen, cyano, trifluoromethyl, loweralkanoyl, nitro, loweralkyl, loweralkoxy, carboxy, lowercarbalkoxy, trifluoromethoxy, acetamido, loweralkylthio, loweralkylsulfinyl, loweralkylsulfonyl, trichlorovinyl, trifluoromethylthio, trifluoromethylsulfinyl, or trifluoromethylsulfonyl;

R_2 is amino, mono or diloweralkyl amino, acetamido, acetimido, ureido, formamido, formimido or guanidino; and

R_3 is carbamoyl, cyano, carbazoyl, amidino or N-hydroxycarbamoyl;

wherein said loweralkyl, loweralkyl containing, lower alkoxy and loweralkanoyl groups contain from 1 to 3 carbon atoms.

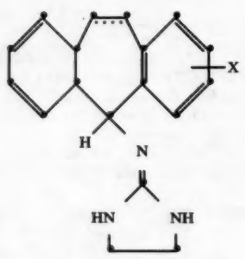
4,590,202

N-(2-IMIDAZOLIDINYLIDENE)-5H-DIBENZO[A,D]CYCLOHEPTEN-5-AMINE COMPOUNDS AND α_2-ADRENERGIC ANTAGONISTIC USES THEREOF

David C. Remy, North Wales, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

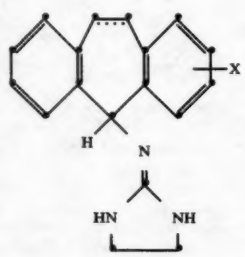
Filed Jan. 19, 1984, Ser. No. 571,981
Int. Cl.[4] C07D *403/30;* A61K *31/415*
U.S. Cl. 514—392 12 Claims

1. A compound having the structure:



wherein ..... the designation between the 10 and 11 positions indicates that the bond may be a saturated single bond or an unsaturated double bond, X is hydrogen, halogen, lower alkoxy, lower alkylthio, trifluoromethyl, trifluoromethylthio, lower alkyl cyano or hydroxy; and pharmaceutically acceptable salts thereof.

11. A method of treating hypertension which comprises administering an effective antihypertensive amount of a compound having the structure:



wherein the ..... bond designation between the 10 and 11 positions indicates that the bond may be a saturated signle bond or an unsaturated double bond, X is hydrogen, halogen, lower alkoxy, lower alkylthio, trifluoromethyl, trifluoromethylthio, loweralkyl, cyano, or hydroxy; and pharmaceutically acceptable salts thereof.

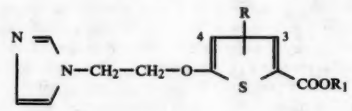
4,590,203

DERIVATIVES OF THIOPHENE-2-CARBOXYLIC ACID AND THEIR PHARMACEUTICALLY ACCEPTABLE ACID OR BASE ADDITION SALTS AND USE IN TREATMENT OF CONDITIONS CAUSED BY THROMBOXANE A_2

Dieter Binder, and Christian Noe, both of Vienna, Austria, assignors to Laevosan-Gesellschaft m.b.H. & Co. KG, Linz, Austria

Filed Nov. 4, 1983, Ser. No. 548,753
Claims priority, application Austria, Nov. 5, 1982, 4041/82
Int. Cl.[4] A61K *31/415;* C07D *403/00*
U.S. Cl. 514—397 10 Claims

1. A derivative of the thiophene-2-carboxylic acid of the general formula



(I)

in which R in position 3 or 4 of the thiophene nucles is hydrogen, methyl, chlorine or bromine and R_1 is hydrogen or C_1-C_4-alkyl, and its pharmaceutically acceptable acid or base addition salts.

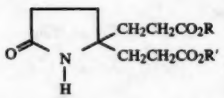
4,590,204

5-OXO-2,2-PYRROLIDINEDIPROPANOIC ACID AND DERIVATIVES AS COGNITION ACTIVATORS

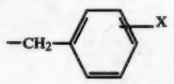
Donald E. Butler, Ann Arbor, Mich., assignor to Warner-Lambert Company, Morris Plains, N.J.

Division of Ser. No. 381,483, May 24, 1982, Pat. No. 4,454,327.
This application Apr. 5, 1984, Ser. No. 596,981
Int. Cl.[4] A61K *31/40*
U.S. Cl. 514—424 12 Claims

1. A pharmaceutical composition for reversing amnesia caused by electroconvulsive shock consisting essentially of a compound having the structural formula



wherein R and R′ are the same or different and are



wherein X is hydrogen, alkyl of from one to six carbon atoms, alkoxy of from one to six carbon atoms, halo, or trifluoromethyl; alkyl having from one to six carbon atoms; or a pharmaceutically acceptable metal or amine cation; in combination with a pharmaceutically acceptable carrier; provided that R and R′ may not be different pharmaceutically acceptable metal or amine cations.

11. A method for reversing amnesia caused by electroconvulsive shock in a mammal in need of such treatment, which method comprises administering to said mammal a pharmaceutical composition defined in claim 1.

4,590,205

ANTIINFLAMMATORY AND/OR ANALGESIC 2,3-DIARYL-5-HALO THIOPHENES

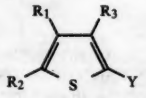
Stephen B. Haber, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 354,300, Mar. 3, 1982, abandoned. This application Jan. 17, 1984, Ser. No. 570,450

Int. Cl.[4] A61K *31/38, 31/44*

U.S. Cl. 514—438 16 Claims

1. A method of treating inflammation, pain or both in a mammal which comprises administering to the mammal an effective antiinflammatory or analgesic amount of at least one compound of the formula:



where

R_1 and R_2 are independently pyridyl or

where

X is H, F, Cl, C_1–C_2 alkyl, C_1–C_2 alkoxy, $R_4S(O)_n$, R_4R_5N or NO_2;

n is 0, 1 or 2;

R_3 is H or C_1–C_2 alkyl;

R_4 and R_5 are independently C_1–C_2 alkyl; and

Y is F, Cl, Br or I; provided that,

(a) when Y is Br or I, then one of R_1 and R_2 is other than phenyl or 4-chlorophenyl; and

(b) when Y is Br or I and one of R_1 and R_2 is 4-chlorophenyl, then the other of R_1 and R_2 is other than 4-fluorophenyl;

or a pharmaceutically suitable salt thereof when R_1 and R_2 are independently pyridyl or when X is R_4R_5N.

4,590,206

INHALATION PHARMACEUTICALS

Raymond B. Forrester, Sandbach, and Terence D. Boardman, Northwich, both of England, assignors to Fisons plc, Ipswich, England

Continuation of Ser. No. 399,748, Jul. 19, 1982, abandoned. This application May 3, 1984, Ser. No. 606,542

Claims priority, application United Kingdom, Jul. 24, 1981, 8122846

Int. Cl.[4] A61K *31/35*

U.S. Cl. 514—456 10 Claims

1. A capsule, cartridge, or aerosol container containing an inhalation drug for the treatment of allergic airway disease, said drug consisting essentially of spray-dried sodium cromoglycate in finely divided and unagglomerated form, wherein a substantial proportion of the individual drug particles have a ring doughnut shape, at least 50% by weight of said particles having diameters less than 60 microns.

4,590,207

THERAPEUTIC AND/OR PREVENTIVE OPHTHALMIC SOLUTION FOR INTRAOCULAR HYPERTENSION AND GLAUCOMA

Takashi Tomiuga, Tokorozawa; Keiichi Nomura, Houya, and Tetsuya Tajima, Noda, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan

Filed Jan. 9, 1985, Ser. No. 689,903

Claims priority, application Japan, Jan. 18, 1984, 59-5663

Int. Cl.[4] A61K *31/34*

U.S. Cl. 514—470 7 Claims

1. A method of treating glaucoma and intraocular hypertension which comprises instilling into the eye of a patient requiring such treatment, an ophthalmic solution comprising a pharmaceutically acceptable carrier liquid and an amount of isosorbide mononitrate sufficient to reduce intraocular pressure.

4,590,208

ANTI-FUNGAL COMPOSITIONS EMPLOYING METAL SALTS OF CARBOXYLIC ACIDS

Edward A. Hilditch, Frome; Robert E. Hambling, Warminster; Colin R. Sparks, and David A. Walker, both of Frome, all of England, assignors to Cuprinol Limited, Somerset, England

Continuation of Ser. No. 384,707, Jun. 3, 1982, abandoned, which is a continuation of Ser. No. 202,216, Oct. 30, 1980, Pat. No. 4,374,852, which is a continuation of Ser. No. 36,271, May 4, 1979, abandoned. This application Jun. 14, 1984, Ser. No. 620,410

Claims priority, application United Kingdom, May 5, 1978, 18026/78

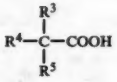
Int. Cl.[4] A01N *55/02*

U.S. Cl. 514—500 2 Claims

1. A fungicidal composition comprising a mixture of:

(a) a copper salt of a primary or secondary saturated acyclic carboxylic acid, said copper salt being a mixture of C_8, C_9 and C_{10} primary or secondary saturated acyclic carboxylic acids, and

(b) a copper salt of a tertiary saturated acyclic carboxylic acid having the formula



wherein

R^3, R^4 and R^5 each represent an alkyl group and together contain about 8 carbon atoms, the weight ratio of the copper salt of said primary or secondary saturated carboxylic acid to the copper salt of said tertiary saturated acyclic carboxylic acid being about 50:50.

4,590,209

ALKOXY-ACYL CARNITINES AND PHARMACEUTICAL COMPOSITIONS CONTAINING SAME

Claudio Cavazza; Paolo De Witt; Maria O. Tinti, and Emma Quaresima, all of Rome, Italy, assignors to Sigma-Tau Industrie Farmaceutiche Riunite S.p.A., Rome, Italy

Continuation of Ser. No. 265,008, May 19, 1981, abandoned. This application Aug. 11, 1983, Ser. No. 522,546

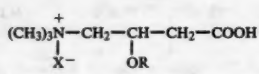
Claims priority, application Italy, May 30, 1980, 48854 A/80

The portion of the term of this patent subsequent to Nov. 5, 2002, has been disclaimed.

Int. Cl.[4] C07C *101/30;* A61K *31/22*

U.S. Cl. 514—547 5 Claims

1. An alkoxy-carboxyl carnitine halogenide having the general formula I



(I)

wherein: x^- is a chlorine or bromine; and R is an alkoxy substituted saturated aliphatic monocarboxylic acid radical having 4 to 6 carbon atoms, excluding ethoxyacetyl and excluding alicyclic compounds.

4,590,210

COMPOSITIONS FOR TREATMENT OF OCULAR HYPERTENSION

Maurice E. Langham, 9 Candlelight Ct., Lutherville, Md. 21093

Continuation-in-part of Ser. No. 19,037, Mar. 9, 1979, Pat. No. 4,275,074. This application Apr. 1, 1981, Ser. No. 245,735

Int. Cl.[4] A61K *31/225*

U.S. Cl. 514—548 **4 Claims**

1. A composition for lowering mammalian intraocular pressure comprising 3,4-dipivaloyl α-methyl epinephrine or the pharmacologically acceptable acid addition salt thereof present in an amount to provide about 0.01 to about 5 milligrams daily when administered about 1 to about 4 times daily, but at less than an amount which would induce substantial mydriasis, together with a ophthalmically acceptable vehicle.

4,590,211

PROCESS FOR THERAPEUTIC TREATMENT

John J. Voorhees, Ann Arbor, and Wendell Wierenga, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo and Regents of the University of Michigan, Ann Arbor, both of, Mich.

Continuation of Ser. No. 492,364, May 9, 1983, abandoned, which is a continuation of Ser. No. 357,369, Mar. 12, 1982, abandoned, which is a continuation of Ser. No. 174,971, Aug. 4, 1980, abandoned, which is a division of Ser. No. 787,230, Apr. 13, 1977, Pat. No. 4,235,887. This application May 30, 1984, Ser. No. 615,661

The portion of the term of this patent subsequent to Nov. 25, 1997, has been disclaimed.

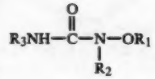
Int. Cl.[4] A61K *31/17*

U.S. Cl. 514—594 **1 Claim**

1. A process for treating a dermatological disease which comprises:

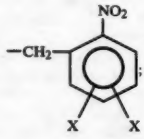
(a) administering to a human or animal afflicted with a dermatological disease treatable with hydroxyurea a composition comprising a pro-drug in combination with a pharmaceutical carrier, and

(b) irradiating the diseased area with radiation having a wave length of from abour 2500 to about 3600 angstroms in an amount sufficient to convert said administered prodrug to a pharmaceutically active form and in a concentration effective to alleviate the said disease and the prodrug is a compound of the formula:

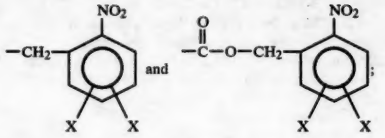


XXIVb

wherein R_1 is selected from the group H and



R_2 and R_3 are selected from the group H,



and X is H, methoxy, chloro and bromo, provided that at least one of the groups R_1, R_2 and R_3 is not H.

4,590,212

METHOD OF INCREASING THE RATE OF WOUND HEALING AND COMPOSITION

Joel E. Bernstein, Deerfield, Ill., assignor to Soft Sheen Products, Inc., Chicago, Ill.

Filed Dec. 9, 1981, Ser. No. 328,904

Int. Cl.[4] A61K *31/16*

U.S. Cl. 514—629 **16 Claims**

1. A method of increasing the rate of healing of a wound in a patient having a wound comprising topically applying to the wound an effective amount of acetaminophen to increase the rate of healing of the wound.

4,590,213

ANTI-ANXIETY METHOD

Paul Stark, Indianapolis, Ind., assignor to Eli Lilly and Company, Indianapolis, Ind.

Filed Apr. 8, 1983, Ser. No. 483,087

Int. Cl.[4] A61K *31/135*

U.S. Cl. 514—653 **9 Claims**

1. A method for treating anxiety in a human subject in need of such treatment which comprises the administration to said human of an effective amount of fluoxetine or norfluoxetine or pharmaceutically acceptable salts thereof.

4,590,214

METHOD OF TREATMENT FOR HERPES

Leonard Zamore, Woodbridge, Conn., assignor to Sepreh, Inc., Woodbridge, Conn.

Continuation of Ser. No. 139,842, Apr. 14, 1980, abandoned. This application Jun. 25, 1981, Ser. No. 277,174

Int. Cl.[4] A61K *31/11, 33/00, 33/04*

U.S. Cl. 514—702 **7 Claims**

1. A method of treating the viral disease Herpes in a living body which comprises the step of subjecting an inflamed area of the body to a treatment with a composition comprising a saturated dialdehyde containing from 2 to 6 carbon atoms, a lower alkanol and an alkalinating agent.

4,590,215

GROWTH INHIBITOR FOR CARIOGENIC BACTERIA

Yuzo Yamaguchi, and Toshiya Sato, both of Kanagawa, Japan, assignors to Takasago Perfumery Co., Ltd., Tokyo, Japan

Filed Jun. 20, 1984, Ser. No. 622,598

Claims priority, application Japan, Jun. 21, 1983, 58-110113

Int. Cl.[4] A61K *31/045*

U.S. Cl. 514—729 **9 Claims**

1. A composition for inhibiting growth of *Streptococcus mutans,* comprising an antibacterially effective amount of l-α-cadinol and a pharmaceutically acceptable carrier.

4,590,216

PROCESS FOR THE MANUFACTURE OF ALCOHOLS USING RUTHENIUM AND LANTHANIDE CATALYSTS

Bernard D. Dombek, Charleston, W. Va., assignor to Union Carbide Corporation, Danbury, Conn.

Filed Sep. 7, 1984, Ser. No. 648,028

Int. Cl.[4] C07C *27/06*

U.S. Cl. 518—700 30 Claims

1. Process for preparing low molecular weight alcohols by reacting hydrogen and carbon monoxide in the presence of a homogeneous catalyst system comprising a ruthenium carbonyl complex and a rare-earth-containing complex selected from the group of compounds consisting of La, Ce, Yb and Lu solubilized in a solvent capable of maintaining said catalyst system in a homogeneous liquid phase.

4,590,217

PROCESS FOR THE MANUFACTURE OF ACETIC ACID, ACETALDEHYDE AND ETHANOL

Ernst I. Leupold, Neu-Anspach; Hans-Joachim Schmidt, Königstein, and Friedrich Wunder, Flörsheim am Main, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Continuation of Ser. No. 462,053, Jan. 28, 1983, abandoned. This application Nov. 6, 1984, Ser. No. 668,695

Claims priority, application Fed. Rep. of Germany, Jan. 30, 1982, 3203060

Int. Cl.[4] C07C *27/06*

U.S. Cl. 518—716 8 Claims

1. A method for making a mixture containing acetic acid, acetaldehyde, and ethanol as the principal products, which method comprises reacting carbon monoxide and hydrogen at an elevated temperature and an elevated pressure in the presence of a supported catalyst prepared by a method consisting of impregnating a silicic acid or silicate carrier with a catalytic composition consisting essentially of a salt or complex of rhodium and a promotor which is a chloride of at least one element selected from the group consisting of Sc, Y, Ce, Pr, Nd, Sm, Gd, Tb, Dy, Ho, and Yb.

4,590,218

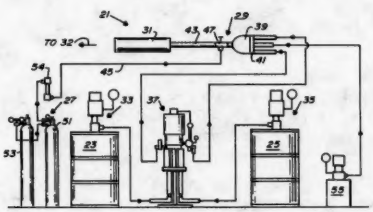
METHOD AND APPARATUS FOR FORMING A CHEMICAL COMPOSITION FROM CROSS-LINKING COMPONENTS AND PRODUCT OF THE METHOD

Richard T. Vass, Antioch, Calif., assignor to The O'Brien Corporation, South San Francisco, Calif.

Filed Jun. 19, 1985, Ser. No. 746,993

Int. Cl.[4] C08G *18/14*

U.S. Cl. 521—50 58 Claims



1. A method for forming a chemical composition from two liquid components selected for cross-linking reaction with each other, the chemical composition being adapted for variation of density of the resulting product by introduction of varying amounts of an inert blowing agent, said method comprising,

selecting the liquid components to be suitable for interaction with each other to form a solid chemical composition product,

storing each of the liquid components separately,

individually transferring and separately regulating flow ofthe liquid components by separate regulating means to a mixing location,

selecting an inert blowing agent in order to avoid altering chemical characteristics of the chemical composition product formed from the two liquid components, the blowing agent further being selected in order to produce density reduction within the chemical composition product by physical expansion,

storing the blowing agent separately from the two liquid components,

transferring the inert blowing agent to the mixing station,

adjusting the regulated flow of inert blowing agent to the mixing station in order to mix a predetermined instantaneous amount of blowing agent with the two liquid components to achieve an instantaneously variable density for the resulting chemical composition product,

conducting the mixture of the two liquid components and the blowing agent through an expansion chamber, selected with a configuration and internal dimensions for allowing substantially complete expansion of the chemical composition to a substantially relaxed condition by means of the blowing agent within the expansion chamber, and

allowing the fully expanded chemical composition product to pass in its substantially relaxed and fully expanded condition from the expansion chamber to an application zone.

4,590,219

PROCESS FOR THE PREPARATION OF ELASTOMERIC MOLDED PARTS HAVING URETHANE OR URETHANE AND UREA GROUPS WITH IMPROVED LIGHT FASTNESS AND WEATHER RESISTANCE

Dietmar Nissen, Heidelberg; Matthias Marx, Bad Durkheim, and Hans U. Schmidt, Ludwigshafen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Apr. 22, 1983, Ser. No. 488,038

Claims priority, application Fed. Rep. of Germany, Apr. 29, 1982, 3215908

Int. Cl.[4] B29C *67/22, 45/02, 39/22;* C08J *9/34*

U.S. Cl. 521—51 26 Claims

1. A process for the preparation of elastomeric molded parts having urethane or urethene and urea linkages which comprises reacting

(a) an organic polyisocyanate,

(b) polyester polyols with molecular weight of 1000 to 3000 and hydroxyl numbers of 170 to 35 produced by polycondensation of organic dicarboxylic acids and a polyol mixture consisting essentially of

(1) 15 to 30 parts by weight of 1,4-butanediol,

(2) 40 to 55 parts by weight of 1,5-pentanediol, and

(3) 15 to 30 parts by weight of 1,6-hexanediol, and

(c) a chain extender

wherein components (a) through (c) are processed by reaction injection molding mixing techniques for casting in an open or injection into a closed mold.

2. The process of claim 1 wherein a cellular molded part is produced by incorporating a blowing agent into the formulation to produce a molded part which has a cellular core and non-cellular external skin.

15. An elastomeric molded part prepared In accordance with the process of claim 2.

4,590,220

METHOD OF PRODUCING A SILICONE WATER-BASED ELASTOMER

Therese M. Bauman, and Alan L. Freiberg, both of Midland, Mich., assignors to Dow Corning Corporation, Midland, Mich.

Filed May 24, 1985, Ser. No. 737,607
Int. Cl.[4] C08J *9/30*
U.S. Cl. 521—68 **4 Claims**

1. A method of producing a foam in which the ingredients are stored before use as two parts, Part I consisting essentially of 100 parts by weight of an anionically stabilized, hydroxyl enblocked polydiorganosiloxane having a weight average molecular weight of about 50,000, the organic radicals being monovalent hydrocarbon radicals containing les than seven carbon atoms per radical or 2-(perfluoroalkyl)ethyl radicals having less than seven carbon atoms per radical, present as an emulsion of dispsered particles in water, the emulsion having a pH of greater than 9 (A), from 1 to 10 parts by weight of (D), collodial silica and (F) from 1 to 10 parts by weight of fibers having a diameter of from 1 to 10 micrometers and a length of from 30 micrometers to 10 millimeters with a length to diameter ratio of greater than 10 to 1, or from 0.2 to 1.5 parts by weight of lauryl alcohol, or mixtures thereof, and Part II consisting essentially of 0.1 to 2.0 parts by weight of dialkyltindicarboxylate (B), from 1 to 10 parts by weight of (C) alkylorthosilicate of the formula $Si(OR')4$ where R' is a lower alkyl radical of from 1 to 4 carbon atoms inclusive, and from 15 to 35 parts by weight of (D) colloidal slica; the method consisting essentially of (1) mixing Part I and Part II to produce an emulsion of the ingredients dispersed in water, (2) immediately forming a froth of the mixture, then (3) immediately removing water from the froth to produce a foam.

4,590,221

METHOD FOR THE PREPARATION OF LIGHT-RESISTANT AND WEATHER-PROOF POLYOLEFIN FOAMS

Werner Kühnel, Neunkirchen-Schöneshof, and Paul Spielau, Troisdorf-Eschmar, both of Fed. Rep. of Germany, assignors to Dynamit Nobel AG, Troisdorf, Fed. Rep. of Germany

Filed Nov. 28, 1984, Ser. No. 675,359
Claims priority, application Fed. Rep. of Germany, Dec. 2, 1983, 3343676
Int. Cl.[4] C08J *9/10*
U.S. Cl. 521—85 **12 Claims**

1. In a method for the preparation of foams of a polyolefin by crosslinking by addition of an organic peroxide or by means of radiation crosslinking and foaming by a chemical blowing agent by the action of heat under normal pressure conditions, the improvement comprising adding, in addition to any other adjuvants and aids, a combination of

(a) phenolic antioxidants,

(b) substituted benzophenones and/or substituted benzotriazoles and

(c) sterically hindered amines to the polyolefin to obtain a light-resistant and weather-proof foam of the polyolefin.

4,590,222

LOWER DENSITY SILICONE ELASTOMERIC FOAM

Therese M. Bauman, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Filed Oct. 16, 1985, Ser. No. 787,852
Int. Cl.[4] C08J *9/02*
U.S. Cl. 521—88 **6 Claims**

1. A method of controlling a combination of physical properties of a silicone elastomeric foam consisting essentially

(A) Mixing

(1) 100 parts by weight of triorganosiloxy endblocked polydiorganosiloxane having a viscosity in the range of 20 to 40 Pa.s at 25° C. and at least two vinyl radicals per molecule,

(2) from 0 to 40 parts by weight of a benzene soluble resin copolymer of triorganosiloxy and SiO_2 units where the triorganosiloxy units are trimethylsiloxy units and dimethylvinyl units and the mol ratio of triorganosiloxy units to SiO_2 units is about 0.7 to 1 and the copolymer has from 1.4 to 2.2 weight percent silicon-bonded vinyl radical,

(3) from 5 to 200 parts by weight of platinum per million parts by weight of polydiorganosiloxane (1) as catalyst,

(4) from 5 to 10 parts by weight of organohydrogensiloxane having an average of at least 3 silicon-bonded hydrogen atoms per molecule and an average of no more than one silicon-bonded hydrogen atom per silicon atom,

(5) from 20 to 40 parts by weight of hydroxyl endblocked polydiorganosiloxane having from 2 to 4 weight percent hydroxyl radical,

(6) from 0 to 100 parts by weight of filler, and then

(B) adding

(7) from 1 to 15 parts by weight of organic alcohol having from 3 to 12 carbon atoms to change the ratio of density to compressibility of the resultant foam, the mixture having a viscosity of less than 100 Pa.s at 25° C., and then

(C) allowing the mixture to produce a froth and cure at room temperature into a closed-cell, elastomeric silicone foam.

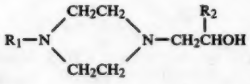
4,590,223

PRODUCING POLYURETHANES USING HYDROXY-ALKYL PIPERAZINE CATALYST COMPOSITIONS

Shoji Arai, Yamaguchi, and Masazumi Hasegawa, Kanagawa, both of Japan, assignors to Toyo Soda Manufacturing Co., Ltd., Shinnanyo, Japan

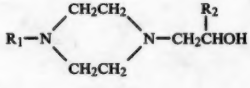
Continuation of Ser. No. 601,915, Apr. 17, 1984, abandoned, which is a continuation of Ser. No. 476,705, Mar. 18, 1983, abandoned. This application Jun. 24, 1985, Ser. No. 748,140
Claims priority, application Japan, Mar. 23, 1982, 57-44625
Int. Cl.[4] C08G *18/20, 18/14;* B01J *31/00;* C07D *295/08*
U.S. Cl. 521—118 **15 Claims**

1. A catalytic composition for producing polyurethane, comprising a substance of the following formula:



where R_1 is methyl and R_2 is a group selected from —H, $—CH_3$ and $—CH_2CH_3$.

15. A reaction mixture for producing polyurethane comprising (1) a substance of the following formula:



where R_1 is methyl and R_2 is a group selected from —H, $—CH_3$ and $—CH_2CH_3$, (2) a polyesterpolyol or polyetherpolyol and (3) a polyisocyanate.

4,590,224

SILOXANE-CONTAINING POLYISOCYANURATE

Kurt C. Frisch, Jr., Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Aug. 20, 1984, Ser. No. 642,451
Int. Cl.[4] C08G *18/00*
U.S. Cl. 521—155 **19 Claims**

1. A siloxane-modified isocyanurate polymer comprising the reaction product of a reaction mixture comprising (a) a siloxane-containing polyahl having at least 2 primary or secondary amine groups or hydroxyl groups other than Si—O—H groups per molecule or a polyahl mixture comprising said siloxane-containing polyahl in an amount such that such mixture con-

tains at least about 10% by weight of siloxane groups, (b) a polyisocyanate and (c) a catalyst for the trimerization of isocyanate groups to isocyanurate groups.

4,590,225

POLYURETHANE PRODUCTS BASED ON ALKYLENE OXIDE ADDUCTS OF ANILINE HAVING REDUCED VISCOSITY

Alexander Korczak, Grosse Ile, and William W. Levis, Jr., Wyandotte, both of Mich., assignors to BASF Corporation, Wyandotte, Mich.

Division of Ser. No. 510,441, Jul. 5, 1983, Pat. No. 4,517,383. This application Jan. 22. 1985, Ser. No. 693,577

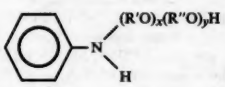
Int. Cl.[4] C08G *18/14, 18/32*

U.S. Cl. 521—167 **12 Claims**

1. In a process for preparing a polyurethane polymer wherein an organic polyisocyanate is reacted with a polyol component, the improvement comprising, employing as the polyol component a polyol mixture comprising, based upon 100 parts by weight of the component,

(a) from 0 part to 90 parts by weight of a customarily used polyol, and

(b) from 100 parts to 10 parts by weight of a cogeneric mixture of compounds having the structural formula:



wherein

R′ and R″ are 2 to 4 carbon alkylene radicals which may be the same or different;

x is an integer from 0 to 50;

y is an integer from 0 to 50; and

x+y must be greater than 1 and less than 50.

4,590,226

POLYETHER POLYOLS CONTAINING HYDROXYMETHYL SUBSTITUTED 1,3-DIOXANE FOR USE IN POLYURETHANES

James P. Brown, Sterrebeek; William G. Carroll, Vossem; Ronald N. May, Brussels; Erik M. B. Merckx, Mechlin, and David J. Sparrow, Overijse, all of Belgium, assignors to Imperial Chemical Industries Inc., London, England

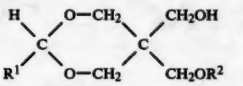
Filed Jan. 29, 1985, Ser. No. 696,168

Claims priority, application United Kingdom, Feb. 15, 1984, 8404022

Int. Cl.[4] C08G *18/14*

U.S. Cl. 521—174 **12 Claims**

1. A polyether polyol having an average hydroxyl value in the range 400 to 650 mgKOH/g which is an alkoxylated derivative of a polyhydric alcohol being itself a single compound or a mixture of compounds according to the general formula (I)



(I)

where

R^1 is —H, —CH_3 or OCH_3

R^2 is —H, —CH_2OH or —$CH_2C(CH_2OH)_3$.

4,590,227

WATER-SWELLABLE ELASTOMER COMPOSITION

Morio Nakamura, Kakogawa; Shigeji Obayashi, Akashi; Shinichi Takemori, Takasago; Hitoshi Tanaka, and Motomu Hirakawa, both of Kakogawa, all of Japan, assignors to Seitetsu Kagaku Co., Ltd., Hyogo, Japan

Filed Oct. 24, 1984, Ser. No. 664,175

Int. Cl.[4] C08L *1/26, 3/04, 7/00, 9/00*

U.S. Cl. 523—130 **15 Claims**

1. A water-swellable elastomer composition consisting essentially of a homogeneous mixture of an elastomer 5–300 parts by weight of a water-absorbent resin per 100 parts by weight of the elastomer and wherein said water-absorbent resin absorbs water in an amount of at least 20 times the weight of the resin and has particle size of 400 μm or less, and 1–50 parts by weight of a water-soluble resin per 100 parts by weight of the elastomer.

4,590,228

INJECTION COMPOSITION FOR FILLING OR REINFORCING GROUNDS

Michel Soreau, Montmorency, and Daniel Siegel, Montesson, both of France, assignors to Societe Francaise Hoechst, Puteaux, France

Filed Feb. 15, 1985, Ser. No. 702,140

Int. Cl.[4] E02D *3/12;* **E21B** *33/138*

U.S. Cl. 523—131 **2 Claims**

1. A composition for treating subsurface formations consisting essentially of an alkali metal silicate present as an aqueous solution and at least one water-soluble aminoplastic resin, wherein the aminoplastic resin is made from an aldehyde selected from the group consisting of formaldehyde, glyoxal, and mixtures thereof, and urea.

4,590,229

PHENOLIC RESIN-POLYISOCYANATE BINDER SYSTEMS

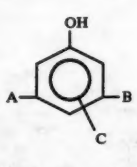
John J. Gardikes, Worthington, Ohio, assignor to Ashland Oil, Inc., Russell, Ky.

Filed Jun. 4, 1984, Ser. No. 617,231

Int. Cl.[4] B22C *11/22*

U.S. Cl. 523—143 **18 Claims**

1. A binder composition comprising, in admixture, a resin component, a hardener component, and a curing component; said resin component including a solution of a non-aqueous phenolic resin in an organic solvent wherein said resin which comprises a condensation product of a phenol having the general formula:



wherein A, B, and C are hydrogen, hydrocarbon radicals, or halogen, wherein at least about 1 mole percent of said phenol is an alkyl substituted phenol with an aldehyde having the general formula R′CHO wherein R′ is a hydrogen or a hydrocarbon radical of 1 to 8 carbon atoms and wherein said organic solvent is substantially free from polar solvents, and is at least about 80 percent by weight of aromatic hydrocarbons; said hardener component comprises liquid polyisocyanate containing at least two isocyanate groups.

4,590,230

ADHESIVE COMPOSITION FOR CERAMIC TILES

Keiichi Kamada, Kamakura; Katuaki Iiyama, Odawara; Yasushi Yano, Kawasaki, and Isao Itoh, Ichikawa, all of Japan, assignors to Mitsui Toatsu Chemicals, Incorporated, Tokyo, Japan

Filed Sep. 4, 1984, Ser. No. 647,070

Int. Cl.[4] C08K *5/00;* C08F *294/00*

U.S. Cl. 524—77 19 Claims

1. An emulsion adhesive composition for ceramic tiles, which composition comprises:

(a) an aqueous emulsion selected from a synthetic rubber latex or an acrylic emulsion, said emulsion containing 40–65% by weight of the resin component;

(b) a filler in an amount of 50–350 parts by weight on a solid basis per 100 parts by weight on a solid basis to the aqueous emulsion; and

(c) a resin solution in an amount of 20–250 parts by weight on a non-volatile component basis per 100 parts by weight on a solid basis of the aqueous emulsion, said resin solution containing a resinous tackifier dissolved in a solvent and/or plasticizer; said composition containing 0.5% by weight or less of a surfactant based on the amount of the composition.

11. An emulsion adhesive composition for ceramic tiles, which composition comprises:

(a) an aqueous emulsion selected from a synthetic rubber or an acrylic emulsion, said emulsion containing 40–65% by weight of the resin component,

(b) an inorganic filler selected from calcium carbonate, clay, talc or asbestos in an amount of 50–350 parts by weight on a solid basis per 100 parts by weight on a solid basis for the aqueous emulsion, and

(c) a resin solution in an amount of 20–250 parts by weight on the non-volatile component basis per 100 parts by weight on a solid basis for the aqueous emulsion, said resin solution containing at least one resinous tackifier selected from rosin, modified rosins and derivatives thereof, polyterpene resins, modified terpenes, aliphatic hydrocarbon resins, aromatic hydrocarbon resins, phenol resins, xylene resins and coumarone-indene resins, and had a sofenting point of 80° C.–130° C., said tackifier being dissolved in a solvent and/or plasticizer, said composition containing 0.5% by weight of less of a surfactant based on the amount of the composition.

4,590,231

POLYOLEFIN COMPOSITIONS STABILIZED AGAINST DEGRADATION USING HYDROXYLAMINE DERIVATIVES

Raymond Seltzer, New City; Ambelal R. Patel, Ardsley; Peter W. Stewart, Yorktown Heights, and Charlene White, Bronx, all of N.Y., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Continuation-in-part of Ser. No. 540,732, Oct. 11, 1983, abandoned. This application Jul. 23, 1984, Ser. No. 633,549

Int. Cl.[4] C08K *5/17*

U.S. Cl. 524—100 17 Claims

1. A composition, stabilized against discoloration, which comprises

(a) a saturated polyolefin or mixture thereof,

(b) a stabilizing amount of an alkaline metal salt of a fatty acid, or mixture thereof,

(c) a stabilizing amount of a phenolic antioxidant, or mixture thereof, selected from the group consisting of n-octadecyl 3,5-di-tert-butyl-4-hydroxyhydrocinnamate, neopentanetetrayl tetrakis(3,5-di-tert-butyl-4-hydroxyhydrocinnamate), di-n-octadecyl 3,5-di-tert-butyl-4-hydroxybenzylphosphonate, 1,3,5-tris(3,5-di-tert-butyl-4-hydroxybenzyl)isocyanurate, thiodiethylene bis(3,5-di-tert-butyl-4-hydroxyhydrocinnamate), 1,3,5-trimethyy-2,4-6-tris(3,5-di-tert-butyl-4-hydroxybenzyl)benzene, 3,6-dioxaoctamethylene bis(3-methyl-5-tert-butyl-4-hydroxyhydrocinnamate), 2,6-di-tert-butyl-p-cresol, 2,2'-ethylidene-bis(4,6-di-tert-butylphenol), 1,3,5-tris(2,6-dimethyl-4-tert-butyl-3-hydroxybenzyl)isocyanurate, 1,1,3-tris (2-methyl-4-hydroxy-5-tert-butylphenyl)butane, 1,3,5-tris[2-(3,5-di-tert-butyl-4-hydroxyhydrocinnamoyloxy)-ethyl]-isocyanurate, 3,5-di-(3,5-di-tert-butyl-4-hydroxybenzyl)-mesitol, hexamethylene bis(3,5-di-tert-butyl-4-hydroxyhydrocinnamate), 1-(3,5-di-tert-butyl-4-hydroxyanilion)-3,5-di(octylthio)-s-triaxine, N,N'-hexamethylene-bis(3,5-di-tert-buty-4-hydroxyhydrocinnamamide), calcium bis-(ethyl 3,5-di-tert-butyl-4-hydroxybenzylphosphonate), ethylene bis[3,3-di(3-tert-butyl-4-hydroxyphenyl)butyrate], octyl 3,5-di-tert-butyl-4-hydroxybenzylmercaptoacetate, bis(3,5-di-tert-butyl-4-hydroxyhydrocinnamoyl)hydrazide, and N,N'-bis[2-(3,5-tert-butyl-4-hydroxyhydroxocinnamoyloxy)ethyl[oxamide, and

(d) a stabilizing amount of a hydroxylamine derivative of the formula

wherein T_1 is alkyl of 1 to 36 carbon atoms, cycloalkyl of 5 to 12 carbon atoms, aralkyl of 7 to 9 carbon atoms, or said aralkyl substituted by alkyl of 1 to 4 carbon atoms or by one or two halogen atoms, T_2 is hydrogen, or independently has the same meaning as T_1; and the carbon content of T_1 and T_2 together is 6 to 36 carbon atoms.

4,590,232

HEAT-RESISTANT CPVC RESIN COMPOSITION

Yoshihisa Tsubokura, Ibaraki; Sumio Yamamoto; Eiji Aoishi, both of Settsu, and Tamio Fujita, Akashi, all of Japan, assignors to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha, Osaka, Japan

Continuation of Ser. No. 486,084, Apr. 18, 1983, abandoned. This application Mar. 11, 1985, Ser. No. 709,369

Claims priority, application Japan, Apr. 22, 1982, 57-68494

Int. Cl.[4] C08L *27/24, 25/14*

U.S. Cl. 524—178 4 Claims

1. A highly transparent heat-resistant molding resin composition characterized in that the composition comprises 70 to 50% by weight of postchlorinated polyvinyl chloride and 30 to 50% by weight of a copolymer consisting of 97 to 75% by weight of methyl methacrylate and 3 to 25% by weight of a styrene monomer, and a stabilizing effective amount of an organic tin stabilizer.

4,590,233

STABILIZATION OF POLYVINYL CHLORIDE

Werner Erwied, Langenfeld; Bernd Wegemund, Haan; Peter Wedl, Loxstedt-Bexhövede, and Kurt Worschech, Loxstedt, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Düsseldorf-Holthausen, Fed. Rep. of Germany

Continuation of Ser. No. 581,658, Feb. 21, 1984, abandoned, which is a continuation of Ser. No. 361,402, Mar. 24, 1982, abandoned. This application Dec. 14, 1984, Ser. No. 681,939

Claims priority, application Fed. Rep. of Germany, Apr. 3, 1981, 3113442

Int. Cl.[4] C08K *5/07*

U.S. Cl. 524—357 13 Claims

1. In a stabilized polyvinyl chloride molding mixture containing a stabilizer combination based upon alkali metal, alkaline earth metal, and/or zinc soaps, powdered, crystalline, hydrous aluminosilicate, and flow promoters, the improvement which comprises, per 100 parts by weight of polyvinyl chloride,

(a) from about 0.2 to 5 parts by weight of a synthetic, crystalline, powdered alkali metal aluminosilicate containing from about 13 to 25 percent by weight of water of crystallization, which has the composition

$0.7–1.1Me_2O.Al_2O_3.1.3–2.4SiO_2$

wherein Me represents an alkali metal, with respect to the anhydrous form; and

(b) from about 0.1 to 5 parts by weight of at least one compound selected from the group consisting of β-diketones of the formula

$$R^1—CO—CHR^2—CO—R^3$$

wherein R^1 and R^3, which may be identical or different, each represent a linear or branched alkyl or alkenyl having from 1 to 36 carbon atoms, an aralkyl having from 7 to 36 carbon atoms, or an aryl or cycloaliphatic having less than 14 carbon atoms, the cycloaliphatic group optionally being olefinically unsaturated and R^1 and R^3 being unsubstituted or substituted, and R^2 represents hydrogen or an alkyl or alkenyl of from 1 to 36 carbon atoms, and R^1 and R^2 may form a divalent alkylene with from 2 to 5 carbon atoms.

4,590,234
MELT-MOLDABLE FLUORINE-CONTAINING RESIN COMPOSITION

Takeo Tasaka; Akiyoshi Kawaguchi, and Yozaburo Tsujikawa, all of Tokushima, Japan, assignors to Otsuka Kagaku Kabushiki Kaisha, Osaka, Japan

Filed Nov. 9, 1984, Ser. No. 669,989

Claims priority, application Japan, Dec. 22, 1983, 58-243147

Int. Cl.[4] C08K *3/10*

U.S. Cl. 524—413 **2 Claims**

1. A fluorine-containing resin composition which consists essentially of a potassium titanate fiber and at least one fluorine-containing resin selected from the group consisting of poly(chlorotrifluoroethylene), copolymer of tetrafluoroethylene and a copolymerizable monomer (a), chlorotrifluoroethylene-ethylene copolymer, tetrafluoroethylene-ethylene copolymer, polyvinylidene fluoride and copolymer of vinylidene fluoride and a copolymerizable monomer (b).

the copolymerizable monomer (a) being selected from to group consisting of

fluoro-olefin of the formula

$$XCF_2(CF_2)mCF=CF_2 \quad (I),$$

fluorovinyl ether of the formula

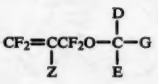
$$XCF_2(CF_2)nOCF=CF_2 \quad (II),$$

perfluoroalkyl vinyl ether of the formulae

$$XCF_2(CF_2)_nOCF(CF_3)CF_2OCF=CF_2 \text{ and} \quad (III)$$

$$Y—CF_2CF_2OCF(CF_3)CF_2OCF=CF_2 \quad (IV)$$

perfluoroallyloxy compound of the formula



(V)

wherein X is F or H, m is 0 to 9, n is 0 to 7, Y is Cl, $—SO_2F$, —COF, $—CO_2H$, $—CO_2R^1$, $—CF_2CO_2R^1$, $—(CF_2)xR^1$, R^1 being F or CF_3, x is 1 to 6, Z is Cl or F, D is $—CF_2R^2$ or

R^2 being F, Cl, $—SO_2F$, —COF, $—CO_2H$, $—CO_2R^1$, $—CF_2CO_2R^1$ or $—(CF_2)xR^1$, E is F, $—CF_3$, $—CF_2CO_2R^1$ or $—CF_2Cl$, G is F or $—CF_3$,

the copolymerizable monomer (b) being selected from the group consisting of tetrafluoroethylene, hexafluoropropylene, chlorotrifluoroethylene and vinyl fluoride,

the potassium titanate fiber being contained in an amount of 5 to 40% by weight based on the total amount of the fiber and the resin.

4,590,235
DUAL-LAYER COATING CONTAINING ALUMINUM-FLAKE PIGMENT AND COATED ARTICLE

Daniel J. Troy, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation of Ser. No. 612,658, May 21, 1984, abandoned, which is a continuation of Ser. No. 420,510, Sep. 20, 1982, abandoned, which is a continuation-in-part of Ser. No. 80,084, Sep. 28, 1979, Pat. No. 4,359,504. This application Apr. 8, 1985, Ser. No. 721,215

Int. Cl.[4] C08K *3/08, 5/56, 7/06, 5/07*

U.S. Cl. 524—439 **7 Claims**

1. In a high-solids enamel coating composition having

(1) binder constituents consisting essentially of a film-forming material and a crosslinker for the film-forming material wherein the film-forming material is selected from the group consisting of acrylic resins, polyester resins, and alkyd resins having a weight-average molecular weight of 500–10,000;

(2) a solvent for the binder constituents in an amount of no more than 100% by weight of the binder; and

(3) chromatic and metallic-flake pigments;

the improvement wherein the metallic-flake pigment is present in the composition in an amount of 10–24% by weight, based on the weight of the binder constituents, and the chromatic pigment is present in an amount sufficient with the amount of the metallic-flake pigment to give a cured coating of this composition a flake orientation index of at least 40.

4,590,236
PROCESS FOR THE PRODUCTION OF HYDROPHOBICIZING AND OLEOPHOBICIZING AGENTS

Joachim König; Carlhans Süling, both of Odenthal, and Christian Lindner, Cologne, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

Filed Feb. 19, 1985, Ser. No. 703,093

Claims priority, application Fed. Rep. of Germany, Feb. 29, 1984, 3407361

Int. Cl.[4] C08F *2/16*

U.S. Cl. 524—460 **4 Claims**

1. A process for the production of an aqueous dispersion of a graft copolymer comprising, graft polymerizing graft monomers, comprising ethylenically-unsaturated perfluoroalkyl monomers having saturated perfluorinated aliphatic alkyl groups containing at least four perflorinated carbon atoms, onto an aqueous acrylate dispersion graft base, in the presence of a water-insoluble solvent capable of dissolving the graft monomers and of initiators which are soluble in the water-insoluble solvent.

4,590,237

FOAM REGULATORS CONTAINING PARAFFIN HYDROCARBONS AND HYDROPHOBIC SILICA

Juan C. Wuhrmann, Duesseldorf; Wolfgang Seiter, Neuss; Brigitte Giesen, Duesseldorf, and Edmund Schmadel, Leichlingen, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf, Fed. Rep. of Germany

Filed Jan. 2, 1985, Ser. No. 688,207

Claims priority, application Fed. Rep. of Germany, Jan. 2, 1984, 3400008

Int. Cl.[4] C11D *1/86, 1/38, 1/68*

U.S. Cl. 524—480 **28 Claims**

1. A foam regulator composition for in surfactant-containing products, consisting essentially of a mixture of

(a) microcrystalline paraffin wax having a solidification point of about 60° to 95° C., in an amount of about 5 to 60%;

(b) hard paraffin having a solidification point of about 40° to 60° C., in an amount of about 15 to 60%;

(c) soft paraffin having a solidification point of about 32° to 42° C., in an amount of about 1 to 50%; and

(d) hydrophobic, finely divided silica, in an amount of about 3 to 18%;

all percentages being by weight based on the total weight of the mixture, said composition being free from surfactants.

4,590,238

HIGH-SOLID SELF-ADHESIVE AND PROCESS FOR THE PRODUCTION THEREOF

Mitsuru Furomoto, and Toshio Asano, both of Arai, Japan, assignors to Daicel Chemical Industries, Ltd., Sakai, Japan

Filed Feb. 10, 1984, Ser. No. 578,891

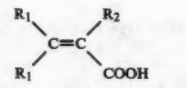
Claims priority, application Japan, Feb. 18, 1983, 58-25760

Int. Cl.[4] C08L *33/26, 33/14, 33/08, 33/10*

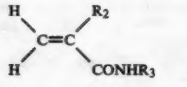
U.S. Cl. 524—745 **14 Claims**

1. A process for preparing an adhesive composition which consists essentially of the steps of mixing

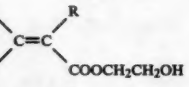
(A) a mixture of vinyl monomers containing (1) at least 50% by weight of alkyl acrylate ester monomer component, based on the weight of said mixture, said alkyl acrylate ester monomer component being selected from the group consisting of methyl acrylate, ethyl acrylate, propyl acrylate, butyl acrylate, 2-ethylhexyl acrylate, decyl acrylate and mixtures thereof, and (2) from 1 to 10% by weight of hydrophilic vinyl monomer component, based on the weight of said mixture, said hydrophilic vinyl monomer component being at least one member selected from the group consisting of hydrophilic vinyl monomers having the formulas



(A)



(B)



(C)

wherein R_1 is H or COOH, R_2 is H or CH_3 and R_3 is H or CH_2OH,

with (B) an emulsifier component, and with (C) water, to obtain a pre-emulsion that is free of an initiator for initiating polymerization of said monomers, said pre-emulsion containing from 3 to 10% by weight of said emulsifier component, based on the weight of said mixture of vinyl monomers, said emulsifier component consisting of a mixture of a nonionic surfactant and an anionic surfactant wherein the amount of said anionic surfactant is from 5 to 40% by weight, based on the weight of said nonionic surfactant, said anionic surfactant being selected from the group consisting of fatty acid salts, higher alcohol sulfates, alkylbenzene sulfonates, dialkyl sulfosuccinates, polyoxyethylene alkyl ether sulfates and polyoxyethylene alkylphenol ether sulfates, and said nonionic surfactant is selected from the group consisting of polyoxyethylene alkyl ethers, polyoxyethylene alkylphenol ethers, sorbitan fatty acid esters, polyoxyethylene fatty acid esters, polyoxyethylene sorbitan fatty acid esters and polyoxyethylene/-polyoxypropylene block copolymers; placing in a polymerization reactor an initial charge consisting essentially of either (i) water, (ii) from 5 to 30% by weight of the total amount of said pre-emulsion, or (iii) both of (i) and (ii); then separately and successively adding to said initial charge (a) the remainder of said pre-emulsion and (b) the entire amount of an initiator for initiating polymerization of said monomers, over a period of time and under conditions effective to carry out emulsion copolymerization of said monomers whereby to obtain an aqueous latex containing from 65 to 75% by weight of solids and having a viscosity in the range of from 500 to 30,000 cP, said solids having an average particle size in the range of from 0.2 to 2.0 microns, the amount of said initiator being in the range of from 0.1 to 1.0% by weight, based on the weight of said mixture of vinyl monomers.

3. An adhesive composition prepared by the process of claim 1.

4,590,239

POLYPHENYLENE ETHER RESIN COMPOSITION SUITABLE FOR ELECTROLESS PLATING

Akitoshi Sugio, Saitama; Masanobu Masu, Osaka; Akikazu Amagai, Tokyo, and Toshihiko Kobayashi, Saitama, all of Japan, assignors to Mitsubishi Gas Chemical Company, Inc., Tokyo, Japan

Filed Dec. 12, 1984, Ser. No. 680,633

Claims priority, application Japan, Dec. 15, 1983, 58-236919

Int. Cl. C08L *53/00*

U.S. Cl. 525—92 **6 Claims**

1. A polyphenylene ether resin composition, suitable for electroless plating, comprising:

(a) a polyphenylene ether resin,

(b) a polystyrene-type resin,

(c) an A-B-A′ type elastomeric block copolymer, wherein A and A′ represent blocks resulting from polymerization of an aromatic vinyl compound, and B represents a block resulting from polymerization of a conjugated diene compound, and

(d) an elastomeric styrene/butadiene random copolymer, wherein the elastomeric styrene/butadiene random copolymer (d) is selected from the group consisting of random copolymers composed of about 25 to about 75% by weight of a component derived from styrene and about 75 to about 25% by weight of a component derived from butadiene, and substantially free of an insoluble gel,

wherein the resin composition contains about 70 to about 95% by weight of components (a) and (b) based upon the total amount of the resin composition and about 5 to about 30% by weight of the total amount of components (c) and (d) based upon the total amount of the resin composition.

4,590,240

THIOETHER-MODIFIED SEALANT COMPOSITIONS

Bruce E. Streeter, Morrisville; John H. MacMillan, Ambler, and Eugene R. Bertozzi, Yardley, all of Pa., assignors to Morton Thiokol, Inc., Chicago, Ill.

Continuation of Ser. No. 590,536, Mar. 19, 1984, abandoned, which is a continuation of Ser. No. 387,626, Jun. 11, 1982, abandoned. This application Dec. 27, 1984, Ser. No. 685,601

Int. Cl.[4] C08F *8/36*

U.S. Cl. 525—123 **3 Claims**

1. A composition comprising the reaction product of (a) the addition reaction product of an unsaturated polymer, composed of at least one monomer which contains at least one carbon to carbon double bond, having terminal hydroxyl groups and 5 to 30 mole percent of an alkanethiol of from 8 to 20 carbon atoms wherein said alkanethiol is added to the double bonds of the unsaturated polymeric backbone, and (b) a polyisocyante compound or mixture of polyisocyanate compounds capable of curing said addition reaction product.

4,590,241

POLYMER BLENDS COMPATIBILIZED WITH REACTIVE POLYMERS EXTENDED WITH MISCIBLE NONREACTIVE POLYMERS

Ronald W. Hohlfeld, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

Filed Dec. 13, 1984, Ser. No. 681,396

Int. Cl.[4] C08L *71/04, 39/04, 23/08, 35/06*

U.S. Cl. 525—132 **12 Claims**

1. A polymer blend comprising a first thermoplastic reactive polymer containing a compatibilizing amount of repeating units containing a pendant cyclic iminoether group and a second thermoplastic reactive polymer containing a compatibilizing amount of repeating units containing a coreactive group which is capable of reacting with said cyclic iminoether group to form a linkage between said first and said second reactive polymer wherein said first reactive polymer and said second reactive polymer are normally incompatible when said first and second polymer do not contain such cyclic iminoether and coreactive groups wherein said blend is characterized by said first and/or said second thermoplastic reactive polymer being extended with a miscible nonreactive polymer(s) in about a five to one weight ratio or less of nonreactive polymer to reactive polymer.

4,590,242

PRODUCTION OF LOW-SHRINKAGE NYLON MOLDINGS

Peter Horn, Heidelberg; Hellmut Bünsch, Leimen; Anton Hesse, Weinheim; Matthias Marx, Bad Durkheim; Dietmar Nissen, Heidelberg, and Walter Heckmann, Weinheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Fed. Rep. of Germany

Filed Jul. 14, 1983, Ser. No. 513,839

Claims priority, application Fed. Rep. of Germany, Jul. 6, 1982, 3225137; Jul. 6, 1982, 3225138

Int. Cl.[4] C08F *8/30, 283/04;* C08L *77/00*

U.S. Cl. 525—183 **4 Claims**

1. A process for the production of a low-shrinkage nylon molding by activated alkaline polymerization of lactams, wherein the polymerization is carried out in the presence of from 5 to 80% by weight, based on the lactam, of a polymer P which

1. is completely soluble in the lactam,
2. separates out in the course of the polymerization at a conversion of from 1 to 50%, and
3. is composed of two or more chemically different blocks, and wherein the polymer P is a graft polymer comprising (W) from 2 to 50% by weight of a polyether prepolymer having a number average molecular weight of from 1,000 to 100,000 and containing, on average, from 0.2 to 1.5 olefinic double bonds per prepolymer molecule, and (X) from 98 to 50% by weight of a monomer selected from the group consisting of styrene and methyl methacrylate, with or without

(Y) from 0 to 10% by weight of monoolefinically unsaturated monomers selected from the group consisting of N-vinylpyrrolidone, N-vinylcaprolactam, acrylamide, methacrylamide and acryloylcaprolactam, and

(Z) from 0 to 10% by weight of a polyunsaturated monomer selected from the group consisting of diolefins of 4 to 10 carbon atoms, esters of olefinically unsaturated carboxylic acids with polyhydric alcohols and vinyl or allyl ethers of polyhydric alcohols.

4,590,243

PROCESS FOR THE PREPARATION OF NYLON BLOCK POLYMERS

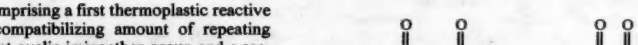
James D. Gabbert, St. Louis; Albert Y. Garner, Manchester, and Ross M. Hedrick, St. Louis, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 374,807, May 4, 1982, abandoned, which is a continuation-in-part of Ser. No. 274,130, Jun. 16, 1981, abandoned. This application Feb. 18, 1983, Ser. No. 467,703

Int. Cl.[4] C08L *77/02*

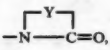
U.S. Cl. 525—184 **103 Claims**

1. A process for preparing a nylon block copolymer which comprises bringing together and reacting lactam monomer, basic lactam polymerization catalyst and an acyllactam functional material of the formula:



wherein,

Q is



with Y equal to C_3–C_{11} alkylene;

a is an integer equal to 1, 2 or 3;

b is an integer equal to 2 or more;

R is a di- or a poly- valent group selected from hydrocarbon groups and hydrocarbon groups containing ether linkages;

Z is a segment of: (1) a polyether; (2) a polyester containing polyether or polymeric hydrocarbon segments; (3) a hydrocarbon; (4) a polysiloxane; or (5) combinations thereof; and

wherein the basic polymerization catalyst is added in an effective amount to result in substantial completion of polymerization of the lactam monomer and acyllactam functional material within ten minutes to form the nylon block copolymer in a molded shape.

4,590,244

ACID HALIDE FUNCTIONAL MATERIALS

James D. Gabbert, St. Louis; Albert Y. Garner, Manchester, and Ross M. Hedrick, St. Louis, all of Mo., assignors to Monsanto Company, St. Louis, Mo.

Continuation-in-part of Ser. No. 374,808, May 4, 1982, abandoned, which is a continuation of Ser. No. 274,325, Jun. 16, 1981, abandoned. This application Feb. 18, 1983, Ser. No. 467,621

Int. Cl.[4] C08F *8/14*

U.S. Cl. 525—332.3 **15 Claims**

1. An acid halide functional material of the formula:

wherein:

X is a halogen;

a is an integer equal to 1, 2, or 3;

b is an integer greater than 2;

R is a di- or a poly- valent group selected from hydrocarbon groups and hydrocarbon groups containing ether linkages; and

Z is a segemnt of: (1) a hydrocarbon having a molecular weight of about 500 to about 4000; or (2) a polyester containing polymeric hydrocarbon segments having molecular weights of about 500 to about 4000.

4,590,245

SELF-CROSSLINKING CATHODICALLY DEPOSITABLE ED-BINDERS CONTAINING MODIFIED ALKYLPHENYL-FORMALDEHYDE CONDENSATION PRODUCTS

Wolfgang Daimer; Johann Gmoser, and Rudolf Schipfer, all of Graz, Austria, assignors to Vianova Kunstharz, A.G., Werndorf, Austria

Filed Mar. 20, 1984, Ser. No. 591,591

Claims priority, application Austria, Mar. 21, 1983, 974/83

Int. Cl.[4] C08G *8/36, 59/08, 59/14*

U.S. Cl. 525—504 **19 Claims**

1. Process for producing cathodically depositable self-crosslinking binders for electrodeposition based on alkylphenol-formaldehyde condensates, characterized in that an alkylphenol-formaldehyde condensate having a molecular weight of at least 500 and a hydroxyl value of between 100 and 700 mg KOH/g, modified through self-condensation or etherification of the phenolic hydroxy groups, obtained through a reaction catalyzed with a base (component A), is reacted simultaneously or separately with (B) amines which carry a tertiary amino group and at least one hydroxy group or primary or secondary amino group (component B) and (C) aromatic or aliphatic or cycloaliphatic polyisocyanates (component C), the weight ratio of components being chosen in order that for each mole of component (B) 2 to 4 NCO-equivalents of component (C) are present and that the resultant isocyanate-group-free reaction product has an amine value of between 40 and 120 mg KOH/g.

4,590,246

METHOD OF POLYMERIZING OLEFINS

Robert A. Dombro, and William Kirch, both of Clinton, Iowa, assignors to Norchem, Inc., Rolling Meadows, Ill.

Continuation-in-part of Ser. No. 153,011, May 27, 1980, abandoned, which is a division of Ser. No. 44,004, May 31, 1979, Pat. No. 4,246,137. This application Jan. 27, 1982, Ser. No. 343,201

Int. Cl.[4] C08F *4/02, 10/00*

U.S. Cl. 526—106 **6 Claims**

1. The method of polymerizing olefins comprising contacting said olefins under polymerizing conditions with a catalyst prepared by:

(a) reacting a zirconium compound of the formula $M_4Zr(C_2O_4)_4.nH_2O$, where M is an alkali metal or ammonium ion and n equals 0 to 10, with a silicon compound of the type A_2SiO_3, where A is an alkali metal, in an aqueous solution at a pH of at least 11 and then adding an acidic material to a pH of about 5–9, to produce a hydrocogel;

(b) aging said hydrocogel at a temperature between about ambient to 90° C. for at least one hour;

(c) washing said hydrocogel of (b) first with water, then with aqueous ammonium nitrate and again with water to remove acid-base salts;

(d) removing water from the resulting washed hydrocogel of (c) to produce a xerocogel by azeotropic distillation by mixing with compounds capable of forming an azeotrope with water or by washing the hydrocogel with a water miscible solvent to produce a substantially water-free, large pore volume zirconia-silica catalyst support;

(e) calcining the resulting xerocogel at a temperature of about 1000°–1800° F. preparatory to its use as an olefin polymerization catalyst support;

(f) introducing a chromium compound onto said calcined support of (e); and

(g) activating to produce an active polymerization catalyst.

4,590,247

PROCESS FOR THE HOMO- AND COPOLYMERIZATION OF ETHYLENE

Hermann Morguet, Wesel-Obrighoven; John Hobes, Dinslaken; Walter Spaleck, Bocholt, and Wolfgang Payer, Wesel, all of Fed. Rep. of Germany, assignors to Ruhrchemie Aktiengesellschaft, Oberhausen, Fed. Rep. of Germany

Filed Oct. 1, 1984, Ser. No. 656,454

Claims priority, application Fed. Rep. of Germany, Oct. 1, 1983, 3335823

Int. Cl.[4] C08F *4/64*

U.S. Cl. 526—124 **17 Claims**

1. A process for the homo- or copolymerization of ethylene at temperatures of from 150° to 350° C. and pressures of from 300 to 3500 bar in the presence of a catalyst comprising

(A) an organometallic compound of a metal of Group III of the Periodic Table of the Elements, and

(B) a titanium compound which is the reaction product of (i) a titanic acid ester and (ii) the reaction product of a magnesium alcoholate and a halogen-containing aluminum alkyl compound.

4,590,248

METHOD FOR PRODUCING A PLASTIC LENS USING TERTIARY ALKYL PEROXY ALLYL CARBONATE

Yasuo Moriya, Chita, and Kazunori Kagei, Niu, both of Japan, assignors to Nippon Oil and Fats Co., Ltd., Tokyo and Asahi Optical Co., Ltd., Fukui, both of, Japan

Filed Mar. 23, 1983, Ser. No. 478,022

Claims priority, application Japan, Mar. 29, 1982, 57-50701

Int. Cl.[4] C08F *4/38, 4/32*

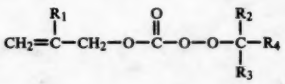
U.S. Cl. 526—228 **13 Claims**

1. A method for producing plastic lenses, which comprises mixing

(a) diethylene glycol bis(allyl carbonate) with

(b) at least one of organic peroxides having a decomposition temperature at selected half-life value for ten hours of not higher than 80° C. and

(c) at least one of peroxycarbonates, having a decomposition temperature at selected half-life value for ten hours of not lower than 90° C., and having a radical copolymerizability to said diethylene glycol bis(allyl carbonate) (a) and represented by the formula



(1)

wherein R_1 represents a hydrogen atom or an alkyl group having 1–4 carbon atoms, R_2 and R_3 represent alkyl groups having 1–4 carbon atoms, and R_4 represents an alkyl group having 1–12 carbom atoms or a cycloalkyl group having 3–12 carbon atoms, as a polymerization initiator,

and casting the resulting mixture in a lens-forming mold while raising the temperature to about 90° C. to form a shaped lens and then annealing said shaped lens at a temperature of about 100°–130° C; and

wherein said organic peroxide (b) being used in a concentration of 2–5% by weight based on said diethylene glycol bis(allyl carbonate) (a), and said peroxycarbonate (c) is used in concentration of 0.05–5% by weight based on said diethylene glycol bis(allyl carbonate) (a).

4,590,249

CATIONIC AMPHOLYTIC TETRAPOLYMERS AND COSMETIC COMPOSITIONS CONTAINING THEM

Jean Cabestany, Stains; Daniel Siegel, Montesson, and Roland Righetti, Le Chesnay, all of France, assignors to Societe Francaise Hoechst, Puteaux, France

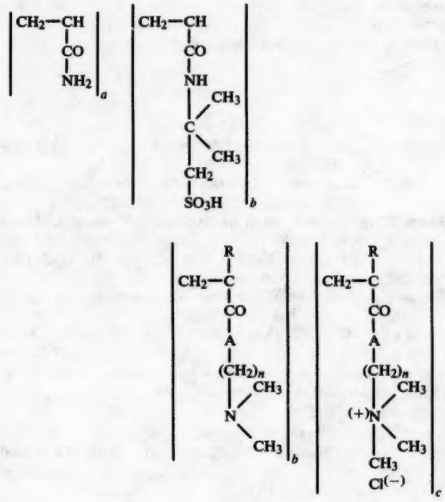
Filed Oct. 10, 1984, Ser. No. 659,539

Claims priority, application France, Oct. 19, 1983, 83 16621

Int. Cl.[4] A61K *7/06, 7/09;* **C08F** *220/58*

U.S. Cl. 526—287 **4 Claims**

1. A cationic ampholytic water-soluble tetrapolymer for cosmetic compositions for treating keratinous fibers, the tetrapolymer having the following general formula:



in which A represents an oxygen atom or an NH group, R represents a hydrogen atom or a methyl group when A represents an NH group, and only a hydrogen atom when A represents an oxygen atom, n is equal to 2 when A represents an oxygen and and n is equal to 3 when A represents an NH group, with a, b, c representing the molar percentages of each monomer used and responding to the following relations:

$$a+2b+c=100$$

$$30<a<75$$

$$10<b<25$$

$$5<c<20.$$

4,590,250

POLYURETHANE COATINGS FOR MAGNETIC RECORDING STRUCTURES AND PRODUCTION THEREOF

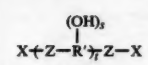
Robert E. Ansel, Hoffman Estates, Ill., assignor to DeSoto, Inc., Des Plaines, Ill.

Continuation-in-part of Ser. No. 571,190, Jan. 16, 1984, abandoned. This application Jul. 12, 1985, Ser. No. 754,409

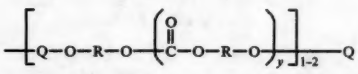
Int. Cl.[4] C08F *26/02, 126/02, 226/02*

U.S. Cl. 526—301 **15 Claims**

1. An electron beam-curable coating composition comprising a liquid composition comprising an hydroxy-functional polyethylenically unsaturated polyurethane having the following structural formula:



in which X is an ethylenically unsaturated monomer initially carrying a single hydroxy group, R′ is the residue of an at least trifunctional polyol or amino alcohol linking compound, s is a number of 0.8 to 10, t is a number from 1 to 15, and Z is a diisocyanate terminated polycarbonate diol polyurethane oligomer having the following structure:



in which R is alkylene having from 1–20 carbon atoms; Q is the residue of an organic diisocyanate; y is at least 1; and R and y are selected to provide a molecular weight for the polycarbonate diol reactant of from 300 to 3000.

4,590,251

PROCESS FOR THE PREPARATION OF POLYAMIDE FROM UNSATURATED NITRILE AND AMMONIUM SALT OF UNSATURATED CARBOXYLIC ACID

Mu-Yen M. Wu, and Lawrence E. Ball, both of Cuyahoga Falls, Ohio, assignors to The Standard Oil Company, Cleveland, Ohio

Continuation of Ser. No. 175,180, Aug. 4, 1980, abandoned. This application Dec. 17, 1984, Ser. No. 682,487

The portion of the term of this patent subsequent to Sep. 20, 2000, has been disclaimed.

Int. Cl.[4] C08F *20/06, 20/42*

U.S. Cl. 526—311 **17 Claims**

1. A process for producing a polyamide resin comprising copolymerizing an alpha, beta-unsaturated nitrile with an ammonium salt of an alpha, beta-unsaturated carboxylic acid.

4,590,252

LIGHT-STABLE ANIONICALLY POLYMERIZED POLYMERS

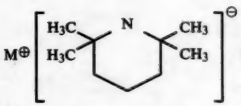
Gerald D. Andrews, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 564,011, Dec. 16, 1983, Pat. No. 4,522,990, which is a division of Ser. No. 369,937, Apr. 19, 1982, abandoned. This application Feb. 1, 1985, Ser. No. 697,403

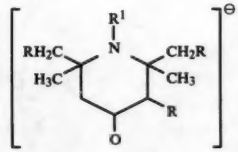
Int. Cl.[4] C08F *20/12*

U.S. Cl. 526—329.7 **3 Claims**

1. Polymer prepared by an anionic polymerization process for polymerizing at least one anionically polymerizable monomer, the initiator in said process being of the formula selected from



and



wherein R is H or C_{1-4} alkyl, R^1 is H, C_{1-18} alkyl or C_{7-12}

aralkyl, and M is alkali metal, the polymer having polymer chain end groups provided by the initiator.

4,590,253

ORGANOSILICON POLYMER AND PROCESS FOR PRODUCTION THEREOF

Yoshio Hasegawa, Oharai; Takeo Kobori, Taiyo, and Kazushige Fukuda, Kitakyushu, all of Japan, assignors to Kurosaki Refractoris Co., Ltd., Fukuoka and The Foundation: The Research Institute for Special Inorganic Materials, Ibaraki, both of, Japan

Continuation of Ser. No. 296,281, Aug. 26, 1981, abandoned. This application Jan. 18, 1985, Ser. No. 693,311

Int. Cl.[4] C08G *77/60*

U.S. Cl. 528—14 **5 Claims**

1. An organosilicon polymer which comprises a main chain skeleton consisting of the following structural units (A), (B), (C), (D), (E) and (F):

(A)

(B)

(C)

(D)

(E)

(F)

wherein R represents CH_3 or H and wherein each such structural unit is bound through its free valencies with a group or formulae A through F, said structural units forming linear, branched and cyclic structures, said main chain skeleton further having a linear polysilane skeleton of the formula:

in which $2 \leqq n \leqq 10$ and a cyclic polysilane skeleton of the formula:

wherein n is 5, 6 or 7, the infrared absorbtion spectrum of said organosilicon polymer having an absorbtion range of 450 to 300 cm^{-1} in the far infrared region.

4,590,254

NON-AQUEOUS POLY(URETHANE-UREA)

Wen-Hsuan Chang; David T. McKeough, and Michael M. Chau, all of Gibsonia, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Apr. 29, 1985, Ser. No. 728,140

Int. Cl.[4] C08G *18/10*

U.S. Cl. 528—49 **12 Claims**

1. A poly(urethane-urea) which is prepared by adding an isocyanate-terminated prepolymer to a chain extender comprising at least two isocyanate-reactive active hydrogen groups consisting essentially of an amino group, said addition is conducted in an organic medium comprising an alcoholic solvent.

4,590,255

PREPARATION OF IONOMERS AND POLYURETHANE ELASTOMERS FROM CARBOXYLIC ACID-CONTAINING MONOETHER AND POLYETHER POLYOL ADDITION PRODUCTS

James M. O'Connor, Clinton, and Richard L. Frentzel, Guilford, both of Conn., assignors to Olin Corporation, Cheshire, Conn.

Continuation-in-part of Ser. No. 475,785, Mar. 16, 1983, Pat. No. 4,521,615. This application Jan. 30, 1984, Ser. No. 575,087

The portion of the term of this patent subsequent to Jun. 4, 2002, has been disclaimed.

Int. Cl.[4] C08G *18/46, 18/50;* **C07C** *67/08;* **C07F** *3/10, 15/00*

U.S. Cl. 528—71 **14 Claims**

1. A process for making a metal salt of carboxylic acid-containing monoether and polyether polyol addition products comprising the step of:

(a) reacting at least one polyhydroxy-containing monoether or polyether compound with an ethylenically unsaturated dicarboxylic acid selected from the group consisting of maleic acid and fumaric acid, and mixtures thereof in the presence of a peroxy-type free-radical initiator, said weight ratio of said polyhydroxy containing monoether or polyether compound to said acid to being from about 99:1 to about 70:30; and

(b) neutralizing the formed addition product with a sufficient amount of metal ions selected from the group of mono-, di- or trivalent metal ions of Groups 1a, 2a, 8, 1b and 2b of the Periodic Table to convert at least about 10% of the carboxylic acid groups in said addition product to salt groups.

7. A process for making a carboxylic acid salt-containing polyurethane elastomer comprising the steps of:

(a) reacting at least one polyhydroxy-containing monoether or polyether compound with an ethylenically unsaturated dicarboxylic acid selected from the group consisting of maleic acid and fumaric acid and mixtures thereof, in the presence of a peroxy-type free-radical initiator to form a carboxylic acid-containing monoether or polyether polyol addition product; said weight ratio of said monoether or polyether compound to said acid being from about 99:1 to about 70:30;

(b) neutralizing the formed addition product with a sufficient amount of metal ions selected from the group of mono-, di- or trivalent metal ions of Groups 1a, 2a, 8, 1b and 2b of the Periodic Table to convert at least about 10% of the carboxylic acid groups in said addition product to salt groups; and

(c) reacting said neutralized carboxylic acid-containing monether or polyether polyol with an organic polyisocyanate to form said carboxylic acid salt-containing polyurethane elastomer.

4,590,256

REACTION RESINS FOR IMPREGNATING AND CASTING LARGE-VOLUME COMPONENTS

Heinz Hacker, Nuremberg; Walter Ihlein, Berlin; Heinz-Klaus Laupenmuhlen, Hemhofen, and Willi Mertens, Berlin, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

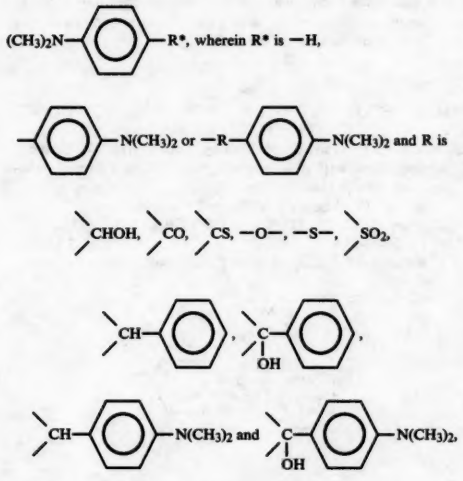
Continuation of Ser. No. 635,424, Jul. 30, 1984, abandoned. This application Sep. 13, 1985, Ser. No. 775,706

Claims priority, application Fed. Rep. of Germany, Jul. 29, 1983, 3327708

Int. Cl.[4] C08G 59/68

U.S. Cl. 528—93 8 Claims

1. An unhardened reaction resin for suitable impregnating or casting of large-volume cryotechnology parts which is a two component mixture consisting essentially of an anionically polymerizable di- or tri-functional epoxy compound and a tertiary amine polymerization catalyst of the general formula



the concentration of catalyst being from about 0.5 to 10 mass parts relative to 100 mass parts epoxy compound.

4,590,257

BORON- AND NITROGEN-CONTAINING COMPOSITIONS AND THEIR USE IN POLYCARBONATE AND POLYESTER-POLYCARBONATE SYNTHESIS

Daniel J. Brunelle, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jul. 5, 1983, Ser. No. 510,500

Int. Cl.[4] C08G 63/62, 63/64

U.S. Cl. 528—176 28 Claims

1. A method for preparing a boron- and nitrogen-containing composition which comprises preparing, at a temperature within the range of about 0°–150° C., a mixture containing

(A) at least one quaternary ammonium hydroxide having the formula

$$(R^1)_4NOH, \quad (I)$$

wherein each R^1 is independently an alkyl radical containing about 1–4 carbon atoms or an aryl or aralkyl radical containing about 6–10 carbon atoms; and

(B) at least one borate having the formula

$$(R^2O)_3B, \quad (II)$$

wherein each R^2 is independently a lower alkyl radical or a radical of the formula X_nAr^1, Ar^1 is an aromatic hydrocarbon radical containing about 6–10 carbon atoms, each X is independently an electron-withdrawing substituent and n is a number from 0 to the number of aromatic carbon atoms in Ar^1 which are capable of substitution; the molar ratio of reagent B to reagent A being about 0.9–2.0:1.

4,590,258

POLYAMIC ACID COPOLYMER SYSTEM FOR IMPROVED SEMICONDUCTOR MANUFACTURING

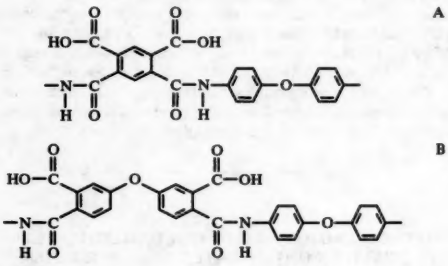
Harold G. Linde, Richmond; Michael W. MacIntyre, and William T. Motsiff, both of Essex Junction, all of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 30, 1983, Ser. No. 566,933

Int. Cl.[4] C08G 73/10

U.S. Cl. 528—189 10 Claims

1. A copolymeric polyamic acid which is capable of forming a polyimide consisting essentially of, in mole percent, from greater than 5 percent to about 45 percent pyromellitic dianhydride, from about 5 percent to about 45 percent oxydiphthalic dianhydride, and about 50 percent of oxydianiline which copolymeric polyamic acid per se exhibits stable solution viscosity, which copolymeric polyamic acid contains 10 to 90 percent recurring units of formula A as set forth below and 90 to 10 percent recurring unites of formula B as set forth below:



4,590,259

HIGH MOLECULAR WEIGHT LINEAR POLYESTERS AND METHOD FOR THEIR PREPARATION

Philip G. Kosky, Schenectady, and Elizabeth A. Guggenheim, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Nov. 30, 1984, Ser. No. 677,114

Int. Cl.[4] C08G 63/76

U.S. Cl. 528—272 15 Claims

1. A method for increasing the molecular weight of at least one solid linear poly(alkylene terephthalate) containing a minor amount of esterification catalyst, said method comprising the steps of:

(A) contacting said polyester, in the form of particles having a maximum diameter of 1.0 mm., at a temperature about 5°–15° C. below its equilibrium melting temperature, with a mixture of an inert gas and at least one aliphatic diol in the gaseous state, the partial pressure of said diol being about 0.1–10 torr, until the proportion of acidic end groups in said polyester has been substantially reduced; and

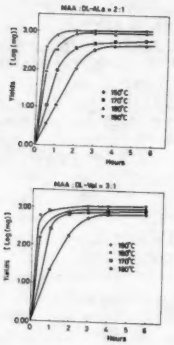
(B) subjecting the product of step A to solid state polymerization at a maximum pressure of about 1 torr.

4,590,260

METHOD FOR PRODUCING COPOLY(AMINO ACID)

Kaoru Harada, 948-2, Azuma 3-chome, Sakura-mura, Niiharigun, Ibaragi 305, and Akira Shimoyama, Niihari, both of Japan, assignors to Fuso Chemical Co., Ltd., Osaka and Kaoru Harada, Ibaragi, both of, Japan

Filed Mar. 8, 1985, Ser. No. 709,586
Claims priority, application Japan, Mar. 28, 1984, 59-60160
Int. Cl.[4] C08G *69/10*
U.S. Cl. 528—328 11 Claims



1. A method for producing copoly(amino acid) which comprises admixing at least one amino acid with at least one compound selected from the group consisting of an ammonium salt of malic, maleic or fumaric acid; an ammonium salt of malic, maleic or fumaric acid monoamide; or malic, maleic or fumaric acid monoamide or diamide; subjecting the mixture to thermal polycondensation, hydrolyzing the product of said polycondensation, and recovering said copoly(amino acid).

4,590,261

METHOD AND APPARATUS FOR DETOXIFICATION OF CYANIDE CONTAMINATED POLYMERIC FILM CHIPS

James D. Schoenhard, Morrison, Ill., assignor to International Technology Services, Inc., Morrison, Ill.

Filed Dec. 12, 1984, Ser. No. 680,665
Int. Cl.[4] C08F *6/28*
U.S. Cl. 528—488 17 Claims

1. A method for the detoxification of polymeric film chip material contaminated with cyanide compounds, said method comprising the steps of:

providing within a container a quantity of polymeric film chip material containing a chlorinatable, dissociable ionic cyanide compound;

submerging the cyanide containing polymeric film chip material in a first treatment solution containing hypochlorite ion until the cyanide in the polymeric film chip material is substantially coverted into cyanate, such first treatment solution maintained at an alkalinity of greater than approximately pH 9.5;

charging to the container additional treatment solution containing hypochlorite ion, reducing the alkalinity of the solution to approximately pH 7.5–8, and maintaining submersion of the chips in the reslutant solution until the generated cyanate is substantially converted into carbon dioxide and nitrogen gases;

rinsing the cyanide-free polymeric material with water; and

removing the cyanide-free polymeric material from the container.

4,590,262

LOW ELECTROLYTE SODIUM LIGNOSULFONATES

Peter Dilling, Isle of Palms, S.C., assignor to Westvaco Corporation, New York, N.Y.

Filed Oct. 5, 1984, Ser. No. 657,973
Int. Cl.[4] C07G *1/00*
U.S. Cl. 530—500 10 Claims

1. A method of producing sodium salts of low electrolyte-containing lignosulfonates suited for use as dye and print paste additives comprising the steps of:

(a) ionizing a phenol component of kraft lignin material in an alkaline liquid medium,

(b) methylolating the ionized phenol component of the lignin material,

(c) lowering the pH of the liquid medium to an acid pH to precipitate the methylolated lignin material,

(d) washing the precipitated lignin material with water to remove inorganic salts and residual reactants therefrom, and

(e) sulfonating the washed, purified methylolated lignin material with a sodium salt of a sulphur-oxygen containing compound in a liquid medium.

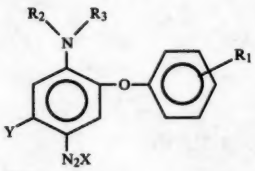
4,590,263

HIGH SPEED DIAZONIUM SALTS USEFUL IN DIAZO TYPE PHOTOREPRODUCTION

Robert C. Desjarlais, South Hadley, and Everett W. Bennett, Longmeadow, both of Mass., assignors to James River Graphics, Inc., South Hadley, Mass.

Filed Sep. 30, 1982, Ser. No. 428,455
Int. Cl.[4] C07C *113/00, 113/04;* G03C *1/52, 5/18*
U.S. Cl. 534—558 7 Claims

1. A diazonium compound of the following formula:



wherein

R_1 is tertiary butyl or tertiary amyl;

Y is hydrogen, alkyl, hydroxyalkyl, cyanoalkyl, cycloalkyl, aralkyl, alkoxy, aryloxy, aralkoxy, aralkylthio, arylthio, alkylthio, halogen, allyl, allyloxy, allylthio, cyanoalkoxy, hydroxyalkoxy, methoxyalkoxy, trifluoroalkyl, alkylacetylamino, morpholino, or dialkyl carbonamido;

R_2 and R_3 are the same or different, and are alkyl, aralkyl, allyl, cyanoalkyl, hydroxyalkyl, hydrogen, acyl, cycloalkyl, beta-chloroalkyl, branched alkyl, or a structure wherein R_2 and R_3 may be linked together to form a heterocyclic structure; and

X is an anion.

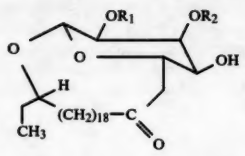
4,590,264

LIPOGLYCOSIDES AND PROCESS OF EXTRACTING SAME

Sidney M. Hecht; David G. Lynn, and Kalakota S. Reddy, all of Charlottesville, Va., assignors to Wofor AG, Giswil, Switzerland

Continuation-in-part of Ser. No. 467,767, Feb. 18, 1983, Pat. No. 4,454,124, which is a continuation of Ser. No. 280,078, Jul. 2, 1981, abandoned. This application Aug. 11, 1983, Ser. No. 522,270
Int. Cl.[4] C07H *15/00*
U.S. Cl. 536—18.2 6 Claims

1. A compound having the formula:



wherein R_1 and R_2 are different and are selected from the group consisting of hydrogen and

---

4,590,265

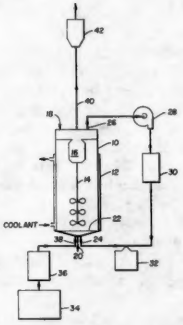
CARBOXYLATED CELLULOSE ESTER AND MANUFACTURE THEREOF

Richard T. Bogan, and Chung-Ming Kuo, both of Kingsport, Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.

Continuation-in-part of Ser. No. 581,014, Feb. 17, 1984, abandoned, which is a continuation-in-part of Ser. No. 542,233, Oct. 14, 1983, abandoned. This application Apr. 18, 1985, Ser. No. 724,747

Int. Cl.[4] C08B *15/04*; C09D *3/18, 11/14*

U.S. Cl. 536—63 **68 Claims**



1. A process for the preparation of carboxylated cellulose esters comprising the steps of

(a) providing a cellulose ester to a reaction zone;

(b) intimately contacting said cellulose ester in said reaction zone with a gaseous stream comprising ozone; and

(c) reacting said cellulose ester with said ozone at a temperature of about 25° to 80° C. for a period of time sufficient to yield a carboxylated cellulose ester product having an acid number of at least about 5.

4,590,266

PROCESS FOR PREPARING CELLULOSE ACETATE

Mitsuru Yamashita, and Kouji Shima, both of Himeji, Japan, assignors to Daicel Chemical Industries, Ltd., Sakai, Japan

Filed Dec. 28, 1984, Ser. No. 687,302

Claims priority, application Japan, Dec. 28, 1983, 58-245665

Int. Cl.[4] C08B *3/06*

U.S. Cl. 536—69 **6 Claims**

1. In a process for preparing cellulose acetate from cellulose and acetic anhydride in a solvent of acetic acid in the presence of a catalyst of sulfuric acid, the improvement which comprises: the reaction system is evacuated at least before the reaction mixture reaches the boiling point thereof until reaction completes, so that the vapor evolved from the reaction mixture is condensed to distill off and the reaction product is concentrated.

4,590,267

CRYSTALLINE DISODIUM SALT OF CEFODIZIM

Karl-Heinz Scheunemann, Frankfurt am Main; Burkhard Mencke, Holzappel; Jürgen Blumbach, Frankfurt am Main; Walter Dürckheimer, Hattersheim am Main, and Klaus Fleischmann, Eschborn, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Continuation-in-part of Ser. No. 430,765, Sep. 30, 1982, abandoned. This application Aug. 28, 1985, Ser. No. 770,406

Claims priority, application Fed. Rep. of Germany, Nov. 3, 1981, 3143537

Int. Cl.[4] C07D *501/56*

U.S. Cl. 544—27 **1 Claim**

1. The crystalline water soluble disodium salt of 7-β-[2-(2-aminothiazol-4-yl)-2-syn-methoximinoacetamidol]3-(5-carboxymethyl-4-methyl-1,3-thiazol-2-ylthiomethyl)ceph-3-em-4-carboxylic acid or an adduct or solvate thereof with water and/or an organic solvent.

4,590,268

PROCESS FOR THE PREPARATION OF 1-DIORGANOCARBAMOYL-POLYALKYLPIPERIDINES

Friedrich Karrer, Zofingen, Switzerland, assignor to Ciba-Geigy Corporation, Ardsley, N.Y.

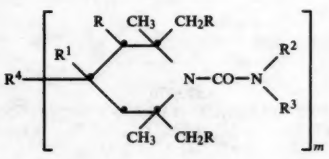
Filed May 2, 1983, Ser. No. 490,288

Claims priority, application Switzerland, May 10, 1982, 2890/82

Int. Cl.[4] C07D *211/10, 211/94, 413/06, 413/12*

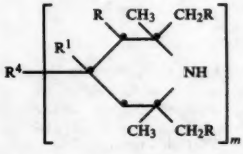
U.S. Cl. 544—121 **6 Claims**

1. A process for the preparation of compounds of the formula II



II

wherein m is an integer from 1 to 4; R is hydrogen or C_1–C_4 alkyl; R_1 is hydrogen, C_2–C_{12} alkoxy, C_2–C_{20} alkanoyloxy, benzoyloxy, C_3–C_{25} carbamoyloxy or CN; R^2 is C_1–C_{18}-alkyl, C_3–C_{12}-alkoxyalkyl, C_2–C_8-hydroxyalkyl, C_3–C_{12}-alkenyl, C_7–C_{14}-aralkyl, C_6–C_{14} aryl, C_7–C_{14}-alkaryl, C_3–C_7-cycloalkyl or 2,2,6,6-tetramethylpiperidin-4-yl; R^3 has one of the meanings of R^2 or R^2 and R^3, together with the N atom to which they are bonded, form a piperidine, pyrrolidine, morpholine, piperidine or 4-alkylpiperidine ring; and R^4 is hydrogen or an m-valent organic radical, or R^1 and R^4 together are oxo-oxygen or a divalent organic radical; by reacting a compound of the formula IIa



IIa

with phosgene in an inert solvent in the presence of a molar amount of a base, and subsequently reacting the product with

a secondary amine of the formula R^2—NH—R^3, also in the presence of a molar amount of a base.

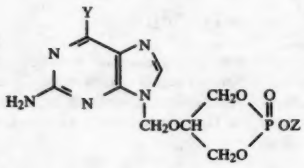
4,590,269

PROCESS FOR PREPARING THE CYCLIC PHOSPHATE ESTER OF SUBSTITUTED 9-(1,3-DIHYDROXY-2-PROPOXYMETHYL)PURINES

Ernest J. Prisbe, Los Altos, and Daniel P. C. McGee, Mountain View, both of Calif., assignors to Syntex (U.S.A.) Inc., Palo Alto, Calif.

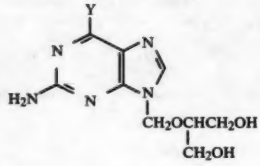
Filed Mar. 29, 1984, Ser. No. 594,508
Int. Cl.[4] C07D *473/18;* A61K *31/52*
U.S. Cl. 544—276 18 Claims

1. A process for preparing a compound of the formula



(I)

wherein y is amino or hydroxy and Z is hydrogen, an optionally substituted hydrocarbon or a pharmaceutically acceptable cation which comprises reacting a Lewis acid complex of the compound of the formula



(II)

with a phosphorylating agent.

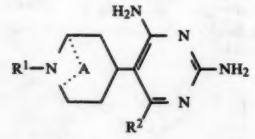
4,590,270

2,4-DIAMINO-[4-PIPERIDINYL]PYRIMIDINES USEFUL AS ANTIBACTERIAL AGENTS, ANTIMALARIAL AGENTS, ANTITUMORS AGENTS

Ivan Kompis, Oberwil; Rita Locher, Basel, both of Switzerland, and Hans Maag, Upper Montclair, N.J., assignors to Hoffmann-La Roche Inc., Nutley, N.J.

Filed Apr. 9, 1984, Ser. No. 598,119
Claims priority, application Switzerland, Apr. 14, 1983, 2003/83; Feb. 10, 1984, 633/84
Int. Cl.[4] A61K *31/505;* C07D *401/04, 451/02*
U.S. Cl. 544—320 18 Claims

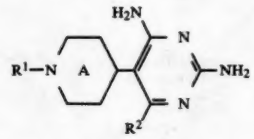
1. A compound of the formula



I

wherein R^1 is naphthyl, or naphthyl or phenyl singly substituted by lower-alkyl, lower alkylthio, lower alkoxy, halogen, amino, lower-alkylamino, di(lower-alkyl)-amino, nitro, trifluoromethyl, lower-alkoxycarbonyl, carboxyl, cyano or —CONHR^3 wherein R^3 is hydrogen, lower-alkyl or the residue which is formed by removal of an amino group from an amino acid R^3NH_2; or phenyl di- or tri-substituted by lower alkoxy R^2 is hydrogen or lower-alkoxy; and A is an optionally present ethylene or 1,3-propylene, and wherein the diaminopyrimidine group has the exo-configuration when A is present, and salts thereof.

15. A pharmaceutical composition for treating bacterial infections, malaria, and tumors comprising an effective amount of a compound of the formula I or a salt thereof



I

wherein R^1 is naphthyl, or naphthyl or phenyl singly substituted by lower-alkyl, lower alkylthio, lower alkoxy, halogen, amino, lower-alkylamino, di(lower-alkyl)-amino, nitro, trifluoromethyl, lower-alkoxycarbonyl, carboxyl, cyano or —CONHR^3 wherein R^3 is hydrogen, lower-alkyl or the residue which is formed by removal of an amino group from an amino acid R^3NH_2; or phenyl di- or tri-substituted by lower alkoxy, R^2 is hydrogen or lower-alkoxy; and A is optionally present ethylene or 1,3-propylene, and wherein the diaminopyrimidine group has the exo-configuration when A is present,
and an inert carrier material.

4,590,271

2,4-DIAMINO-5-(SUBSTITUTED)PYRIMIDINES, USEFUL AS ANTIMICROBIALS

Susan M. Daluge, Chapel Hill, N.C.; Paul M. Skonezny, Clay, N.Y.; Barbara Roth, Chapel Hill, and Barbara S. Rauckman, Durham, both of N.C., assignors to Burroughs Wellcome Co., Research Triangle Park, N.C.

Filed Apr. 29, 1983, Ser. No. 490,196
Claims priority, application United Kingdom, May 1, 1982, 8212727; May 7, 1982, 8213248
Int. Cl.[4] C07D *239/49, 401/06, 405/06;* A61K *31/505*
U.S. Cl. 544—324 4 Claims

1. A compound which is 2,4-diamino-5-(3-benzo[b]thienylmethyl)pyrimidine or a pharmaceutically acceptable salt thereof.

2. A compound which is 2,4-diamino-5-[(6,7-dimethoxybenzo[b]thien-4-yl)methyl]pyrimidine or a pharmaceutically acceptable salt thereof.

4. A method of treating bacterial infections in a mammal having a bacterial infection comprising the administration to said mammal of an effective antibacterial amount of the compound of claim 1 or 2.

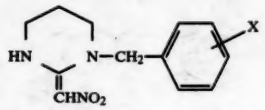
4,590,272

PESTICIDAL 1-(SUBSTITUTED BENZYL)-2-NITROMETHYLENE-TETRAHYDROPYRIMIDINES

Kozo Shiokawa, Kanagawa; Shinzo Kagabu, and Shinichi Tsuboi, both of Tokyo, Japan, assignors to Nihon Tokushu Noyaku Seizo K.K., Tokyo, Japan

Filed Oct. 3, 1984, Ser. No. 657,323
Claims priority, application Japan, Oct. 6, 1983, 58-185854
Int. Cl.[4] C07D *239/02*
U.S. Cl. 544—335 9 Claims

1. A 1-halobenzyl-2-(nitromethylene)tetrahydropyrimidine of the formula



in which X is a halogen atom.

8. A method of combating insects, mites or nematodes which comprises applying thereto or to a habitat thereof an insecticidally, miticidally or nematocidally effective amount of a compound according to claim 1.

4,590,273

ISOQUINOLINE COMPOUNDS

Elmar Konz, Kelkheim; Franz Hock, Dieburg; Joachim Kaiser, Frankfurt am Main, and Hansjörg Kruse, Kelkheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany

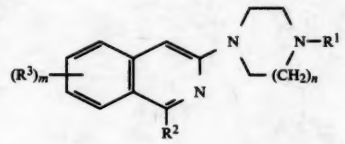
Continuation-in-part of Ser. No. 300,434, Sep. 8, 1981, abandoned. This application Mar. 28, 1984, Ser. No. 594,366

Claims priority, application Fed. Rep. of Germany, Sep. 10, 1980, 3034001

Int. Cl.[4] C07D *401/04;* A61K *31/495*

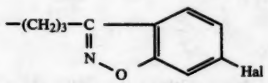
U.S. Cl. 544—363 13 Claims

1. An isoquinoline compound of the general formula I



(I)

in which m denotes one, n denotes one or two R^1 denotes (a) hydrogen, (b) methyl or ethyl, (c) $—(CH_2)_q—COR^4$, in which q is 3, and R^4 is thienyl, phenyl or a phenyl radical monosubstituted or disubstituted by nitro, amino or halogen, or (d)



in which Hal denotes halogen; R^2 denotes hydrogen, methyl or ethyl, and R^3 denotes hydrogen, halogen, hydroxyl, methyl or ethyl, methoxy or ethoxy and a salt thereof with a physiologically acceptable acid.

4,590,274

ANTIHYPERTENSIVE 1-[BIS-(SUBSTITUTED PHENYL)METHYL]-4[2-(1,2,3,4-TETRAHYDRO-SUBSTITUTED NAPHTHALEN-1-YLIDENE)ETHYL]PIPERAZINES

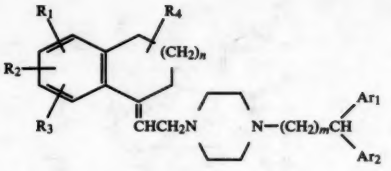
Anthony J. Cocuzza, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed Jan. 3, 1985, Ser. No. 688,382

Int. Cl.[4] C07D *295/02;* A61K *31/495*

U.S. Cl. 544—396 24 Claims

1. A compound having the formula:



(I)

wherein

R_1, R_2 and R_3 are independently n-C_1–C_6 alkyl, hydrogen, C_1–C_6 alkoxy, F,Cl,Br, or R_1 and R_2 or R_2 and R_3 together can form a methylenedioxy bridge;

R_4 is H or C_1–C_6 alkyl;

n is 0, 1 or 2;

m is 0, 1, 2 or 3; and

Ar_1 and Ar_2 are independently phenyl optionally substituted with one or two of halogen, or C_1–C_6 alkoxy groups,

or a pharmaceutically acceptable salt thereof.

17. A method of treating hypertension in a mammal comprising essentially of administering to a hypertensive mammal an antihypertensive amount of a compound of claim 1.

4,590,275

BENZOHETERAZOLO[3,2-A]QUINOLINIUM SALTS

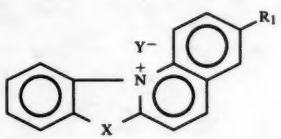
Osvaldo Cox, Guaynabo, and Adriana Baez, San Juan, both of P.R., assignors to Commonwealth of Puerto Rico, San Juan, P.R.

Continuation-in-part of Ser. No. 357,696, Mar. 12, 1982, abandoned. This application Jun. 16, 1983, Ser. No. 504,880

Int. Cl.[4] C07D *471/04, 517/04*

U.S. Cl. 546—62 4 Claims

1. A compound selected from the group consisting benzoheterazol[3,2-a]quinolinium salts of formula 1,



(I)

wherein R_1 is a nitro group and X is selected from the group consisting of oxygen, sulfur and selenium and Y- is a pharmaceutically acceptable anion.

4,590,276

PROCESS FOR THE PREPARATION OF CYCLOPROPYL PYRIDINE COMPOUNDS USEFUL AS CALCIUM CHANNEL BLOCKERS

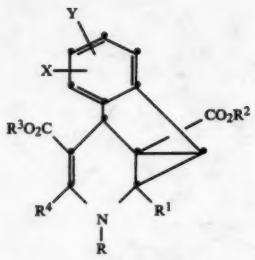
Stella W. King, Lansdale, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Oct. 1, 1984, Ser. No. 655,785

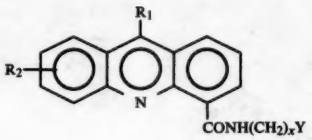
Int. Cl.[4] C07D *221/18, 222/22*

U.S. Cl. 546—75 11 Claims

1. A process for the preparation of a compound represented by the following general structural formula (I):



(I)



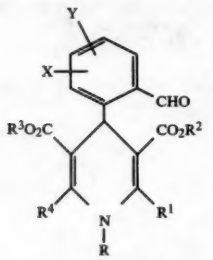
wherein:

R is hydrogen, C_1–C_8 alkyl, benzyl or C_1–C_4 carboalkoxy;

R^1 and R^4 independently are hydrogen, C_1–C_8 alkyl, C_2–C_8 alkenyl C_3–C_8 cycloalkyl or C_1–C_8 hydroxyalkyl;

R^2 and R^3 independently are C_1–C_8 alkyl, C_2–C_8 alkenyl, C_3–C_8 cycloalkyl, C_1–C_8 hydroxyalkyl, C_1–C_8 dihydroxyalkyl, C_2–C_8 alkoxyalkyl, C_3–C_8 alkoxy(alkoxyalkyl) or C_1–C_8 aminoalkyl wherein the amino group is NR^5R^6 in which R^5 and R^6 independently are hydrogen, C_1–C_8 alkyl, C_7–C_{14} phenylalkyl or R^5 and R^6 together with the N atom form a 5 or 6 membered heterocycle selected from the group consisting of piperidinyl, morpholinyl, thiomorpholinyl, pyrrolidinyl, piperazinyl or N'-C_1–C_4-alkylpiperazinyl; and X and Y independently are hydrogen, C_1–C_8 alkyl, C_1–C_8 alkoxy, CF_3, cyano, nitro or halo, or X and Y together with the phenyl group to which they are attached form a naphthyl or benzoxadiazole group,

which comprises treating a compound of the following formula:



wherein R, R^1, R^2, R^3, R^4, X and Y are defined in formula **1** with p-toluenesulfonylhydrazine and heating the reaction mixture.

4,590,277

ACRIDINECARBOXAMIDE COMPOUNDS

Graham J. Atwell; Bruce C. Baguley; William A. Denny, and Gordon W. Rewcastle, all of Auckland, New Zealand, assignors to Development Finance Corporation of New Zealand, New Zealand

Filed Jun. 21, 1983, Ser. No. 506,335

Claims priority, application New Zealand, Jun. 25, 1982, 201084

Int. Cl.[4] **C07D** *219/10, 219/04;* **A61K** *31/47*

U.S. Cl. 546—105 **7 Claims**

1. A compound represented by by the general formula (I),

where

R_1 represents H or NHR_3, where R_3 is H, $COCH_3$, SO_2CH_3, COPh, SO_2Ph or lower alkyl optionally substituted with hydroxyl and/or amino groups;

R_2 represents H or up to two of the groups CH_3, OCH_3, halogen, CF_3, NO_2, NH_2, $NHCOCH_3$, and $NHCOOCH_3$ placed at positions 1–3 or 5–8;

Y represents $C(NH)NH_2$, $NHC(NH)NH_2$, or NR_4R_5, where each of R_4 and R_5 is H or lower alkyl optionally substituted with hydroxyl and/or amino groups; and

x is from 2 to 6,

or an acid addition salt thereof.

4,590,278

NICOTINE ANALOGS

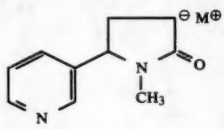
William B. Edwards, III, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.

Division of Ser. No. 229,481, Jan. 29, 1981, Pat. No. 4,332,945. This application Apr. 6, 1984, Ser. No. 597,329

Int. Cl.[4] **C07D** *401/04*

U.S. Cl. 546—281 **5 Claims**

1. A cotinine compound represented by the formula:



where M is an alkali metal cation, dissolved in an aprotic solvent, and wherein the solvent solution of the compound is produced by a process which comprises reacting cotinine with a non-nucleophilic alkali metal hydride or alkali metal amide in an aprotic solvent medium at a temperature in the range of −78° C. to 85° C.

4,590,279

PREPARATION OF (TRIFLUOROMETHYL)PYRIDINES UNDER LIQUID PHASE CONDITIONS

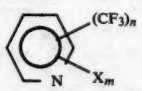
Alexander P. Fung, Pleasant Hill, and Charles A. Wilson, Pittsburg, both of Calif., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 444,773, Nov. 26, 1982, abandoned. This application Aug. 4, 1983, Ser. No. 520,399

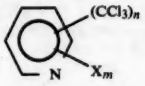
Int. Cl.[4] **C07D** *213/26*

U.S. Cl. 546—345 **21 Claims**

1. A method of preparing a (trifluoromethyl)pyridine compound having the formula



where X represents chlorine or fluorine, n is 1 or 2 and m is 0 or an integer of 1 to 4, which consists essentially of contacting a (trichloromethyl)pyridine compound having the formula



wherein X, m and n are as above-defined, with hydrogen fluoride in the presence of a catalytic amount of from about 0.1 to about 20 mole percent, based on the amount of (trichloromethyl)pyridine compound present, of a catalyst selected from the group consisting of $FeCl_3$, FeF_3, $FeCl_2$, FeF_2, $NbCl_5$, NbF_5, $TaCl_5$, TaF_5, WCl_6, WF_6, $SnCl_4$, SnF_4, $TiCl_4$, TiF_4, CrF_2, $CrCl_2$ and mixtures thereof in a liquid phase reaction at a temperature of from 100° C. to 250° C.

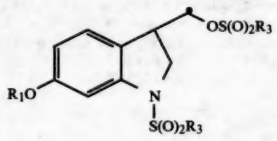
4,590,280

PREPARING INDOLINE DERIVATIVES

Martha A. Warpehoski, Kalamazoo, Mich., assignor to The Upjohn Company, Kalamazoo, Mich.

Filed Mar. 15, 1985, Ser. No. 712,307
Int. Cl.[4] C07C *209/12*
U.S. Cl. 548—491 **3 Claims**

1. A process for preparing a substituted indoline compound of the formula



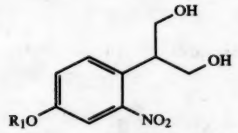
(I)

wherein R_1 is selected from the group consisting of methyl, benzyl, allyl, methylthiomethyl, methoxymethyl, methoxyethoxymethyl, 2,2,2-trichloroethyl and $—CH_2CH_2Si(R_2)_3$ where R_2 is C_1 to C_5-alkyl, or phenyl;

each R_3 is selected from the group consisting of C_1 to C_5-alkyl, phenyl, tolyl and benzoylmethyl,

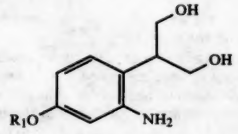
which comprises

(a) reducing a nitrodiol compound of the formula



(II)

under hydrogenation conditions in the presence of a hydrogenation/reduction catalyst for a time sufficient to form an aminodiol compound of the formula



(III)

(b) reacting the aminodiol compound from step (a) with a sulfonylation reactant compound of the formula

$$X—S(O)_2—R_3 \quad \text{(IV)}$$

where X is a halide having an atomic number of from 9 to 35, and R_3 is as defined hereinabove in an amount of the sulfonylation reactant (IV) sufficient to sulfonylate an anilino-amino hydrogen and the hydroxymethyl groups, of the aminodiol (III), in the presence of an acid absorbing base and to effect cyclization of the resulting sulfonylated intermediate so as to form the substituted indoline (I).

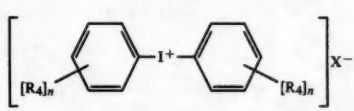
4,590,281

PROCESS FOR PREPARING ALDEHYDES

Yasuo Yamazaki, Machida, and Takehiko Suzuki, Tokyo, both of Japan, assignors to Nippon Petrochemicals Company, Tokyo, Japan

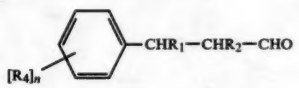
Filed Mar. 7, 1984, Ser. No. 587,166
Claims priority, application Japan, Mar. 9, 1983, 57-37314
Int. Cl.[4] C07C *25/125, 45/30*
U.S. Cl. 548—545 **10 Claims**

1. A process for preparing aldehydes of formula III and iodoaryl of formula IV, characterized in that a diaryliodonium salt represented by formula I is reacted with an unsaturated alcohol represented by formula II in an inert solvent containing a base in the presence of an effectively catalytic amount of a transition metal catalyst at a temperature in the range of about room temperature to about 100° C.:

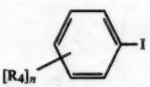


I

$$CHR_1{=}CR_2{—}CH_2OH \quad \text{II}$$



III



IV

wherein

n is an integer of 0 to 3; each R_4, which may be alike or different, is hydrogen, halogen, C_1–C_{12} alkyl, C_3–C_{12} cycloalkyl, aryl, C_1–C_{12} halogenoalkyl, C_1–C_{12} alkoxy, nitro or C_1–C_{12} N-acylamino groups;

X- is a counter ion which is inert to the above reaction; and

R_1 and R_2 are each hydrogen or C_1–C_{12} alkyl.

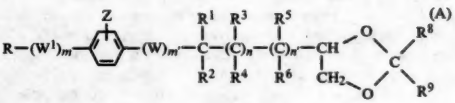
4,590,282

PEST CONTROL AGENTS

Clive A. Henrick, Palo Alto, Calif., assignor to Sandoz Ltd., Basel, Switzerland

Filed Sep. 24, 1984, Ser. No. 653,277
Int. Cl.[4] C07D *317/00*
U.S. Cl. 549—453 **13 Claims**

1. A compound of the formula (A):



(A)

wherein,

each of m and m′ is one;

each of n and n′ is independently zero, one or two;

n″ is zero, one two, three or four;

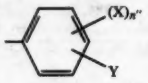
R is lower alkyl, lower alkenyl, lower alkynyl, lower haloalkyl, lower haloalkenyl, lower haloalkynyl, lower alkoxy-

alkyl, lower alkylthioalkyl, cycloalkyl, halocycloalkyl, or cycloalkylalkyl;

each of R^1, R^2, R^3, R^4, R^5, R^6 and R^7 is indpendently hydrogen or lower alkyl;

R^8 is hydrogen or lower alkyl, provided that: when R^9 is other than hydrogen or lower alkyl, then R^8 cannot be lower alkyl;

R^9 is hydrogen, lower alkyl, cycloalkyl or the radical



W is oxygen, sulfur, NR^7 or carbonyl;

W^1 is oxygen, sulfur, sulfinyl, sulfonyl, NR^7 or carbonyl;

each of X and Y is independently hydrogen, lower alkyl, lower alkenyl, lower alkynyl, lower alkoxy, lower alkoxyalkyl, lower alkylthio, lower alkylthioalkyl, lower haloalkyl, lower haloalkenyl, lower haloalkynyl, cycloalkyl or halogen; and

Z is hydrogen, lower alkyl, lower haloalkyl or halogen.

4,590,283

PROCESS FOR MANUFACTURING 5-HYDROXYMETHYLFURFURAL

Antoine Gaset; Luc Rigal, both of Toulouse; Gilles Paillassa, Pau; Jean-Paul Salomé , Vieux-Berquin, and Guy Flèche, Merville, all of France, assignors to Roquette Freres, Lestrem, France

Filed Sep. 14, 1984, Ser. No. 650,637

Claims priority, application France, Sep. 14, 1983, 83 14646

Int. Cl.[4] C07D *307/46*

U.S. Cl. 549—488 **6 Claims**

1. Process for manufacturing 5-hydroxymethylfurfural from a hexose by heterogenous catalysis in contact with a solid catalytic support comprising a strongly acid resin and at a temperature between 70°–80° C., comprising bringing the hexose into contact with the catalytic support said hexose being in the form of a solution of said hexose in a strongly polar aproptic solvent selected from the group consisting of dimethylsulfoxide (DMSO), dimethylformamide (DMF) and N-methylpyrrolidone (NMP), extracting the 5-hydroxymethylfurfural formed by means of a solvent therefor selected from the group consisting of ketones, nitriles and ethers, said solvent being also brought into contact with the catalytic support, the operations of contacting the hexose solution with the catalytic support, on the one hand, and of extraction of the 5-hydroxymethylfurfural formed, on the other hand, being carried out continuously, by the counter-current principle, a volume V of moist catalytic support being placed inside a reaction vessel, corresponding to an amount such that the catalytic ratio is 0.1 to 100, the supply of hexose in solution in the strongly polar aprotic solvent and the supply of extraction solvent being effected in the vicinity respectively of the upper and lower ends of the reaction vessel, the feed flow rate of the hexose containing solvent fed with respect to the volume V of moist catalytic support being 0.03 to 0.3 V/hour, and the flow rate of extraction solvent with respect to the volume V of moist catalytic support being 0.5 to 15 V/hour.

4,590,284

PINEAPPLE KETONE 1'-ALKOXYALKYL DERIVATIVES

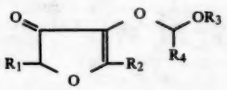
Brian Byrne, Belleville, N.J., and Louise M. L. Lawter, Goshen, N.Y., assignors to Hercules Incorporated, Wilmington, Del.

Continuation-in-part of Ser. No. 627,311, Jul. 2, 1984. This application Apr. 29, 1985, Ser. No. 728,540

Int. Cl.[4] C07D *307/60*

U.S. Cl. 549—477 **8 Claims**

1. A compound of the general formula,



wherein R_1 and R_2 independently are -H, $-CH_3$, or $-CH_2CH_3$; and R_3 is alkyl of from 1 to 10 carbons, alkenyl of from 1 to 10 carbons, or aryl of from 6 to 10 carbons, R_4 is hydrogen, alkyl of from 1 to 10 carbons, alkenyl of from 1 to 10 carbons or aryl of from 6 to 10 carbons.

4,590,285

PROCESS FOR PREPARING A MIXTURE OF TETRAHYDROFURAN AND 3-ALKYL TETRAHYDROFURAN AND COPOLYMERS THEREOF

Richard E. Ernst, Kennett Square, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Division of Ser. No. 502,317, Jun. 8, 1983. This application Nov. 15, 1984, Ser. No. 671,874

Int. Cl.[4] C07C *31/18*; C07D *307/08*

U.S. Cl. 549—509 **12 Claims**

1. In the method of preparing tetrahydrofurans by cyclizing diols, the improvement comprising using a mixture of 1,4-butanediol and 2-alkyl-1,4-butanediol produced by bringing together, at an initial pH of 9–14, and a temperature and pressure suitable reaction,

(a) hydrogen,

(b) hydrogenation catalyst, and

(c) 1,4-butynediol or 1,4-butenediol, and an aldehyde of the structure

R—CHO

where R is hydrogen or an alkyl radical of 1–4 carbon atoms,

in a butynediol or butenediol/aldehyde weight ratio of 2/1 to 200/1.

4,590,286

PROCESS FOR EPOXIDIZING AN OLEFIN

Randy A. Bull, Hopewell, N.J., assignor to FMC Corporation, Philadelphia, Pa.

Filed Oct. 28, 1985, Ser. No. 791,811

Int. Cl.[4] C07D *301/16*

U.S. Cl. 549—526 **16 Claims**

1. A process for epoxidizing an olefin to form the corresponding oxirane comprising the steps of:

(a) forming a reaction mixture by incorporating an olefin, a cyclic anhydride of a polybasic carboxylic acid, and a basic catalyst into a nonaqueous inert solvent, said solvent having a boiling point substantially greater than the boiling point of the oxirane of the olefin, and said anhydride being incorporated in an amount sufficient to maintain the reaction mixture substantially anhydrous,

(b) incorporating hydrogen peroxide into the reaction mixture at a rate controlled to avoid accumulating a substantial excess of hydrogen peroxide in the reaction mixture thereby converting at least part of the olefin to the corresponding oxirane and at least part of the cyclic anhydride to a corresponding polybasic carboxylic acid, and

(c) recovering the oxirane as a distillate from the product of

step (b) and leaving a residue solution of polybasic carboxylic acid in inert solvent.

4,590,287

FLUORINATED TITANOCENES AND PHOTOPOLYMERIZABLE COMPOSITION CONTAINING SAME

Martin Riediker, Riehen; Martin Roth, Giffers; Niklaus Bühler, Marly, and Joseph Berger, Basel, all of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Feb. 2, 1984, Ser. No. 576,518

Claims priority, application Switzerland, Feb. 11, 1983, 784/83

Int. Cl.[4] C07F 11/28

U.S. Cl. 556—53 6 Claims

1. A titanocene of formula I

(I)

wherein M is a tetravalent titanium atom, R^1 is cyclopentadienyl$^{\ominus}$, indenyl$^{\ominus}$ or said cyclopentadienyl substituted by alkyl of 1 to 6 carbon atoms, R^2 and R^3 are each the same and are each phenyl which is substituted by fluorine atoms in at least one of the two ortho-positions relative to the metal-carbon bond, or R^2 and R^3 together are a radical of the formula III

(III)

wherein Q is a phenylene ring and each of the two bonds is in the ortho-position to the Y group and each meta-position to the Y group is substituted by a fluorine atom; or wherein said phenyl ring of R^2 and R^3 and phenylene ring of Q is further substituted by halogen; by amino which is unsubstituted or substituted by alkyl of 1 to 2 carbon atoms or quaternized with an alkyl halide of up to 12 carbon atoms; by pyrrolidino, by piperidino, by piperazino, by morpholino or by N-methylpiperazino; or by aminoalkyl of up to 6 carbon atoms wherein the amino group is unsubstituted or substituted by alkyl of up to 12 carbon atoms or quaternized with an alkyl halide of up to 12 carbon atoms, and Y is methylene, ethylidene, propylidene, a direct bond, O or S,

with the proviso that, when R^2 and R^3 are each pentafluorophenyl, R^1 is cyclopentadienyl substituted by alkyl of 1 to 6 carbon atoms, and, when R^1 is cyclopentadienyl, R^2 and R^3 together are not 2,2'-octafluorobiphenyl.

4,590,288

BI- OR POLYMETALLIC COORDINATION COMPLEX

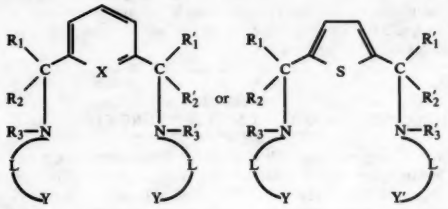
Lawrence P. Klemann, Somerville, N.J., assignor to Exxon Research and Engineering Co., Florham Park, N.J.

Filed Jun. 29, 1983, Ser. No. 508,937

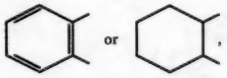
Int. Cl.[4] C07F 1/08, 15/02, 15/04

U.S. Cl. 556—112 8 Claims

1. A complex coordinated with carbon monoxide comprising a salt of a cation and an anion, said cation consisting of two atoms of the same metal complexed with a polydentate binucleating ligand of the formula:



where X is CH, Y and Y' are independently selected from the group consisting of —OH, —NH_2, —NHR, —NR_2, and NR where R is a saturated alkyl or saturated alkylene radical, R_1, R_2, R_3, R'_1, R'_2 and R'_3 are independently —H, —CH_3 or —CH_2CH_3, and L is —CH_2CH_2—, —$CH_2CH_2CH_2$—,



wherein said metal is selected from the group consisting of Li, Na, Sc, Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ru, Rh, Pd, Ag, Cd, Os, Ir and Pt, and wherein the anion of the salt is Cl^-, NCS^-, SO_4^{-2}, $B(C_6H_5)_4^-$, $C_6H_5CO_2^-$, $CH_3CO_2^-$ a mixture of any of these anions.

4,590,289

PROCESS AND APPARATUS FOR PRODUCING ALUMINIUM ALKOXIDES

Gert Albert; Manfred Kamps; Klaus Noweck, all of Brunsbüttel; Ansgar Reichenauer, Marne; Erich Scherf, and Udo Ziegler, both of Brunsbüttel, all of Fed. Rep. of Germany, assignors to Condea Chemie GmbH, Brunsbüttel, Fed. Rep. of Germany

Filed Nov. 29, 1983, Ser. No. 556,112

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1982, 3244972

Int. Cl.[4] C07F 5/06

U.S. Cl. 556—188 19 Claims

1. A process for the continuous production of an aluminium alkoxide comprising:

reacting aluminium alcohol in a reactor, said process including:

supplying the aluminium to the reactor from above;

supplying alcohol to said reactor;

contacting the aluminium with an aluminium alkoxide/alcohol mixture in the form of a bubble bed above a screen in the reactor;

in part recycling to the reactor above the bubble bed overflowing and outflowing aluminium alkoxide and alcohol from the sump of the reactor; and

separating off another portion of the aluminium alkoxide and alcohol, said process including means for controllably interrupting the supply of aluminum, alcohol and the recycling of aluminum alkoxide and alcohol to said reactor.

4,590,290

PROCESS FOR THE PREPARATION OF 6-METHOXY-1-NAPHTHOIC ACID, METHYL ESTERS

John H. Bright, Norwalk, Conn., assignor to American Cyanamid Company, Stamford, Conn.

Filed Mar. 4, 1985, Ser. No. 708,138

Int. Cl.[4] C07C 69/76

U.S. Cl. 560—56 8 Claims

1. In the synthesis of methyl 6-methoxy-1-naphthalene carboxylate by methylation of 6-hydroxy-1-naphthoic acid with

dimethyl sulfate in a liquid organic solvent and in presence of a base, the improvement wherein the liquid organic solvent has a flash point (closed cup) greater than 10° C. and is insoluble in water, and the base is a combination of a alkali metal carbonate and alkali metal hydroxide.

4,590,291

THROMBIN INHIBITORY NEW DIHYDROXYBENZENE ETHER DERIVATIVES

Horst Böshagen, Haan; Ulrich Hörlein, Wuppertal; Gerd Reinhardt, Wuppertal; Friedel Seuter, Wuppertal, and Elisabeth Perzborn, Wuppertal, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

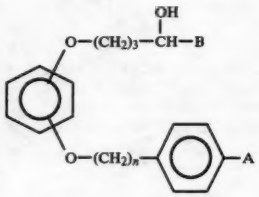
Filed Jun. 7, 1982, Ser. No. 385,355

Claims priority, application Fed. Rep. of Germany, Jun. 26, 1981, 3125059

Int. Cl.⁴ C07C *69/76*

U.S. Cl. 560—64 **10 Claims**

1. An ether derivative of a dihydroxybenzene of the formula



wherein the ether groups are either ortho- or meta- to one another;

A is selected from the group consisting of —COOH, —$COOC_2H_5$, —CH=CH—COOH and —CH=CH—$COOC_2H_5$;

B is an alkyl radical having from 3 to 6 carbon atoms, and n is 1 to 3, or a pharmaceutically acceptable salt thereof.

4,590,292

PROCESS FOR THE MANUFACTURE OF CYCLOPROPYLAMINE

Joseph T. Blackwell, Denham Springs; Harold L. Daughety, Baton Rouge; Henry C. Grace, Baton Rouge, and Ward H. Oliver, Baton Rouge, all of La., assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jun. 10, 1985, Ser. No. 742,680

Int. Cl.⁴ C07C *85/153*

U.S. Cl. 560—124 **14 Claims**

1. In the process for preparing cyclopropylamine from gamma-butyrolactone comprising the steps of (1) cleaving the gamma-butyrolactone ring with a hydrohalide in the presence of a catalyst to form 4-chlorobutyric acid; (2) esterifying said 4-chlorobutyric acid with an aliphatic alcohol to form the 4-chlorobutyrate ester; (3) cyclizing the 4-chlorobutyrate ester to the cyclopropanecarboxylate ester; (4) converting the ester to cyclopropanecarboxamide; (5) converting cyclopropanecarboxamide to cyclopropylamine by a Hofmann reaction; and recovering the purified cyclopropyl-amine; the improvements wherein

(1) the hydrohalide cleaving is promoted by the presence of an aqueous solution of sulfuric acid at a temperature in the range 65°–75° C. and 0–300 psig;

(2) esterifying the thus formed 4-chlorobutyric acid with a secondary or tertiary aliphatic alcohol to form a sterically hindered 4-chlorobutyrate ester;

(3) cyclizing said hindered 4-chlorobutyrate ester to form the hindered cyclopropane-secondary or tertiary carboxylate ester in the presence of a solid alkali metal hydroxide and a phase transfer catalyst in a water-immiscible solvent at temperatures from about 20° to 60° C.;

(4) converting the cyclopropanecarboxylate-secondary or tertiary alcohol ester to the cyclopropanecarboxamide by reacting it with ammonia at a temperature of 25°–150° C. in the presence of a catalyst comprising an alkali metal salt of a polyhydric alcohol having at least two hydroxyl groups located on adjacent carbon atoms; and

(5) then converting the resulting cyclopropanecarboxamide to cyclopropylamine by a modified Hofmann reaction with alkaline hypohalite and aqueous alkaline hydroxide and then recovering said cyclopropylamine product by feeding the chlorinated intermediate with excess caustic into a continuous distillation column.

4,590,293

PROCESS AND APPARATUS FOR FURTHER PROCESSING OF PRESSURIZED EXOTHERMIC REACTIONS

Ralph F. Pascoe, Marysville, Ohio, assignor to Ashland Oil, Inc., Russell, Ky.

Continuation of Ser. No. 340,442, Jan. 18, 1982, abandoned. This application Mar. 23, 1984, Ser. No. 592,739

Int. Cl.⁴ C07C *67/38, 51/14*

U.S. Cl. 560—233 **19 Claims**

1. A continuous process for the carbonylation of α-olefin having up to six carbon atoms for the preparation of a carboxylic acid or ester thereof and for employing the exothermic heat of the reaction to heat the product mixture for subsequent separation of at least one component from the product mixture; which comprises:

(a) reacting a mixture of carbon monoxide, α-olefin of up to six carbon atoms, and an acid selected from the group consisting of an aqueous hydrogen fluoride solution of more than 20 weight percent hydrogen fluoride, and a substantially anhydrous acid selected from the group consisting of hydrogen fluoride and hydrogen chloride under pressure and at a low temperature under conditions whereby a product mixture and exothermic heat at pressure up to 10,000 psia and at temperature below about 100° C.

(b) reacting the product mixture of step (a) with a hydroxy-containing compound selected from the group consisting of water and an alcohol having up to six carbon atoms under conditions whereby additional exothermic heat is produced and a carboxylic acid is produced when the hydroxy compound is water and under conditions whereby an ester is produced when the hydroxy compound is an alcohol.

(c) adiabatically expanding the product mixture of step (a) to below the temperature and pressure of the reaction conditions of step (a),

(d) heating the adiabatically expanded product mixture of step (b) with the exothermic heat from reaction of the mixture of the reactants reacting in step (a) by passing the heat to the adiabatically expanded product mixture, and

(e) transferring the heated adiabatically expanded product mixture of step (c) to a separation processing step and repeating steps (a), (b), (c), (d), and (e) under conditions whereby a continuous process results.

4,590,294

PROTON-CATALYZED REACTIONS CATALYZED BY HYDROGEN ION-EXCHANGED LAYERED CLAYS

James A. Ballantine, West Cross, Wales; Reginald Gregory, Camberley, England; John H. Purnell, Bishopston, Wales; John M. Thomas, Cambridge, and David J. Westlake, Woking, both of England, assignors to The British Petroleum Company Limited, London, England

Continuation of Ser. No. 417,873, Sep. 14, 1982, abandoned, which is a continuation-in-part of Ser. No. 218,552, Dec. 22, 1980, abandoned. This application Aug. 12, 1985, Ser. No. 765,164

Claims priority, application United Kingdom, Dec. 22, 1979, 7944315; May 17, 1980, 8016384; Jul. 5, 1980, 8022102; Jul. 5, 1980, 8022101; Aug. 9, 1980, 8026028

Int. Cl.[4] C07C *67/04*

U.S. Cl. 560—247 10 Claims

1. A process for the production of an ester comprising reacting an olefin selected from the group consisting of ethylene, hex-1-ene, hept-1-ene, oct-1-ene 4-methylpent-1-ene, hex-2-ene, 1,5-hexadiene and cyclohexene, with a carboxylic acid selected from the group consisting of acetic acid, propionic acid, and isobutyric acid at an elevated temperature, and using as an essential catalyst component a hydrogen ion-exchanged layered clay, selected from the group consisting of bentonite, and montmorillonite, and

wherein the hydrogen ion-exchanged layered clay is ion-exchanged under conditions which do not break down the layered structure of the clay,

and said clay having been separated from the ion-exchange media.

4,590,295

PROCESS FOR THE MANUFACTURE OF P-HYDROXYPHENYL-ACETIC ACID

Werner Spielmann, Kelkheim, and Georg Schaeffer, Hofheim am Taunus, both of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Continuation of Ser. No. 225,190, Jan. 15, 1981. This application Apr. 24, 1985, Ser. No. 726,274

Claims priority, application Fed. Rep. of Germany, Jan. 17, 1980, 3001511

Int. Cl.[4] C07C *65/01*

U.S. Cl. 562—478 4 Claims

1. A one-step process for the direct manufacture of p-hydroxyphenyl-acetic acid consisting essentially of reducing unsubstituted p-hydroxymandelic acid in an aqueous hydroiodic acid solvent with HI in the presence of red phosphorous and recovering precipitated p-hydroxyphenylacetic acid.

4,590,296

PROCESS FOR SEPARATION OF BETA-ACIDS FROM EXTRACT CONTAINING ALPHA-ACIDS AND BETA-ACIDS

John M. Cowles, Whitefish Bay; Henry Goldstein, Brookfield; Etzer Chicoye, Milwaukee, and Patrick L. Ting, Brookfield, all of Wis., assignors to Miller Brewing Company, Milwaukee, Wis.

Filed Jan. 25, 1984, Ser. No. 573,801

Int. Cl.[4] C07C *45/80*

U.S. Cl. 568—366 3 Claims

1. A method of separating beta-acids from alpha-acids in a hop extract containing beta-acids and alpha-acids without using organic solvents, said method consisting of the hop extract having a pH of about 9.6 to about 13 by bubbling CO_2 through the extract to lower the pH to about 8.5 to about 9.5 to precipitate the beta-acids and then isolating the pure solid beta-acids from the pure alpha-acids which remain in the aqueous extract.

4,590,297

NOVEL 9-SUBSTITUTED CARBACYCLIN ANALOGS

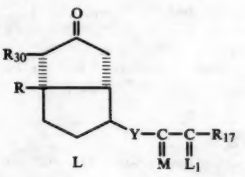
Paul A. Aristoff, Portage, and John C. Sih, Kalamazoo, both of Mich., assignors to The Upjohn Company, Kalamazoo, Mich.

Division of Ser. No. 349,122, Feb. 16, 1982, Pat. No. 4,533,749. This application Mar. 8, 1985, Ser. No. 709,613

Int. Cl.[4] C07C *49/559*

U.S. Cl. 568—374 1 Claim

1. A compound of the formula



wherein

R is C_{1-4}alkyl; R_{30} is hydrogen or R_{30} and R taken together form a methylene moiety;

wherein

L is H,H; α-OR_{12},β-H; α-H,β-OR_{12}; α-CH_2OR_{12},β-H; α-H,β-CH_2OR_{12} wherein R_{12} is hydrogen or a hydroxyl protective group;

wherein

Y is trans —CH=CH—, cis-CH=CH—, $—CH_2CH_2—$, or —C≡C—;

wherein

M is α-OR_{12},β-R_{14}; or α-R_{14},β-OR_{12}, wherein R_{12} is as defined above, and R_{14} is hydrogen or methyl;

wherein

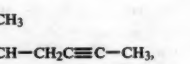
L_1 is α-R_{15},-β-R_{16}; α-R_{16},β-R_{15};

or a mixture thereof wherein R_{15} and R_{16} are hydrogen, methyl, or fluoro being the same or different with the proviso that one of R_{15} and R_{16} is fluoro only when the other of R_{15} and R_{16} is hydrogen or fluoro;

wherein

taken together is

(1)



or

(2) —C≡C—$C_9H_{24}CH_3$ wherein q is an integer of from 2 to 6;

and individual optical isomers thereof.

4,590,298

PRODUCTION OF HYDROXYKETONES FROM FORMALDEHYDE

Tessie M. Che, Westfield, N.J., assignor to Celanese Corporation, New York, N.Y.

Filed Mar. 5, 1985, Ser. No. 708,619

Int. Cl.[4] C07C *45/50*

U.S. Cl. 568—387 17 Claims

1. A process for the conversion of formaldehyde to higher oxygenated hydrocarbons which comprises reacting formaldehyde, carbon monoxide and hydrogen in a basic organic solvent medium in the presence of a soluble catalyst composition consisting essentially of tungsten and Group VIII metal com-

ponents, to yield a product mixture comprising C_4–C_5 hydroxyketones.

4,590,299

2-GUANIDINO-4-HETEROARYLTHIAZOLES

John L. LaMattina, Ledyard, and Christopher A. Lipinski, Waterford, both of Conn., assignors to Pfizer Inc., New York, N.Y.

Division of Ser. No. 593,791, Mar. 27, 1984, which is a division of Ser. No. 449,129, Dec. 13, 1982, Pat. No. 4,452,987, which is a division of Ser. No. 293,547, Aug. 20, 1981, Pat. No. 4,374,843, which is a continuation-in-part of Ser. No. 196,231, Oct. 14, 1980, abandoned. This application Feb. 11, 1985, Ser. No. 700,370

Int. Cl.[4] C07C *49/227*

U.S. Cl. 568—415 2 Claims

1. A 3-halo-4-n-alkoxy-3-buten-2-one wherein said n-alkoxy group is of 1 to 4 carbon atoms and wherein said halo group is chloro or bromo.

4,590,300

PREPARATION OF ALLYLIC COMPOUNDS

Michael J. Mullins, Midland, and Percy J. Hamlin, Beaverton, both of Mich., assignors to The Dow Chemical Company, Midland, Mich.

Continuation-in-part of Ser. No. 499,640, May 31, 1983, abandoned. This application Jan. 9, 1985, Ser. No. 689,891

Int. Cl.[4] C07C *41/14*

U.S. Cl. 568—616 20 Claims

1. A process for preparing an allylic compound corresponding to the formula

XHC=CHY

wherein X is RCH_2— or $RCH_2CH(OR')$— and Y is —CH_2OR' or hydrogen, and when X is RCH_2—, Y is —CH_2OR' and when X is $RCH_2CH(OR')$—, Y is hydrogen, where R is hydrogen or an alkyl moiety having from 1 to about 20 carbons and R' is a C_{1-20} moiety corresponding to the formula $(CHRCHRO)_nR$ wherein R is as previously defined and n is an integer from zero to about 10, comprising contacting an allyl methyl ether corresponding to the formula

X'HC=CHY'

wherein X' is RCH_2— or $RCH_2CH(OCH_3)$— and Y' is CH_2OCH_3 or hydrogen and when X' is RCH_2—, Y' is —CH_2OCH_3 and when X' is $RCH_2CH(OCH_3)$—, Y' is hydrogen where R is as previously defined, with a primary or secondary alcohol, or a (poly)alkylene glycol or monoalkyl ether thereof corresponding to the formula $HO(CHRCHRO)_nR$ in the presence of a catalytic amount of a catalyst present in an amount by weight based on allyl methyl ether of from about 0.1 percent to about 10 percent, consisting essentially of a solid heterogeneous strong acid that contains no mercury or cuprous salt catalysts at an elevated temperature such that the allylic compound is produced.

4,590,301

POLYMERIZATION INHIBITORS

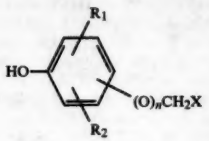
Drahoslav Lim, and Peter C. Morris, both of San Diego, Calif., assignors to Barnes-Hind, Inc., Sunnyvale, Calif.

Filed Oct. 24, 1984, Ser. No. 664,282

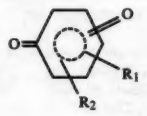
Int. Cl.[4] C07C *43/01, 43/02, 39/12, 50/00*

U.S. Cl. 568—633 34 Claims

1. A compound having the formula (1) or (2):



(1)

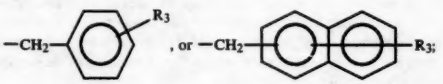


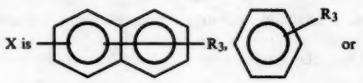
(2)

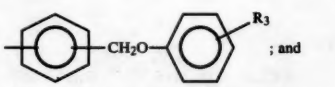
wherein

n is 0 or 1;

R_1 and R_2 are independently H, —OH, C_1–C_6 alkyl,







R_3 is H, —OH, —COO—(C_1–C_6 alkyl), C_1–C_6 alkyl, or C_1–C_6 alkoxy, provided that the compound has at least three rings.

4,590,302

TERPENE ETHERS

Franz Scheidl, and Manfred Gscheidmeier, both of Gablingen, Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Fed. Rep. of Germany

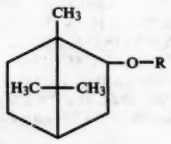
Filed Jul. 25, 1984, Ser. No. 634,403

Claims priority, application Fed. Rep. of Germany, Jul. 27, 1983, 3327014

Int. Cl.[4] C07C *43/18, 43/196*

U.S. Cl. 568—665 1 Claim

1. A terpene ether of the formula



wherein R is a member of the group consisting of

2-(3,3-dimethyl-bicyclo[2.2.1]-hept-2-yl)-ethoxy-cyclohexyl,

4-(1,7,7-trimethyl-bicyclo[2.2.1]-hept-2-oxy-methyl)-cyclohexyl-1-methyl,

4-hydroxymethylcyclohexyl-1-methyl,

2-(2,2,3-trimethyl-cyclopent-1-yl)-ethyl,

(tricyclo[5.2.1.$0^{2,6}$]dec-3-yl)-methyl,

(tricyclo[5.2.1.$0^{2,6}$]dec-4-yl)-methyl,

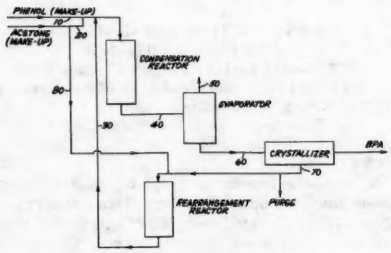
1-(3,3-dimethyl-bicyclo[2.2.1]-hept-2-yl)-prop-2-yl and isolongifolyl.

4,590,303

METHOD FOR MAKING BISPHENOL

Ashok K. Mendiratta, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Jun. 3, 1985, Ser. No. 740,688
Int. Cl.[4] C07C 39/12, 39/16
U.S. Cl. 568—728 5 Claims



1. A process for making bisphenol A by feeding phenol and acetone into a condensation reactor at a temperature of about 50° C. to about 120° C. in the presence of an ion exchange catalyst to produce a mixture of bisphenol A, phenol and bisphenol A isomers, which thereafter are separated in a crystallizer to provide the recovery of bisphenol A and the recycling back to the condensation reactor of a mixture of phenol and bisphenol A isomers, through a rearrangement reactor, which comprises the improvement of diverting part of the acetone initially fed to the condensation reactor to the rearrangement reactor, whereby an improvement in overall acetone conversion is achieved, while the product distribution of the condensation reactor effluent is substantially maintained.

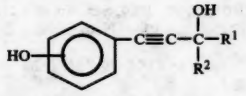
4,590,304

PROTECTED ETHYNYLATED PHENOLS

J. Shield Wallace, Dayton, and Fred E. Arnold, Centervile, both of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Division of Ser. No. 592,033, Mar. 21, 1984, Pat. No. 4,450,833.
This application May 15, 1985, Ser. No. 734,299
Int. Cl.[4] C07C 39/11
U.S. Cl. 568—766 7 Claims

1. A compound of the formula



wherein R^1 and R^2 are the same or different and are selected from the group consisting of hydrogen, C1 to C4 alkyl, phenyl, and substituted phenyl, and wherein R^1 and R^2 together with the carbon atom to which they are attached form a saturated 5- or 6-membered ring.

4,590,305

PROCESS FOR THE SELECTIVE PRODUCTION OF DIHYDROXYBENZENES

Karlheinz Drauz, Freigericht, and Axel Kleemann, Hanau, both of Fed. Rep. of Germany, assignors to Degussa Aktiengesellschaft, Frankfurt, Fed. Rep. of Germany

Filed Mar. 8, 1984, Ser. No. 587,651
Claims priority, application Fed. Rep. of Germany, Mar. 11, 1983, 3308763
Int. Cl.[4] C07C 37/00
U.S. Cl. 568—771 26 Claims

1. A process for the production of a dihydroxybenzene by nuclear hydroxylation of phenol, a substituted phenol, or a phenol ether with hydrogen peroxide in a substantially water-free organic solvent in the presence of a catalyst comprising reacting phenol with hydrogen peroxide in a solution in substantially water-free organic solvent which solvent forms an azeotrope with water, the boiling point of the azeotrope being below the boiling point of hydrogen peroxide, based on normal pressure, said reaction being carried out in the presence of selenium dioxide as a catalyst.

4,590,306

PROCESS FOR THE CONVERSION OF META/PARA-CRESOL MIXTURES

Joachim Korff, Bornheim-Merten, and Karl-Heinz Keim, Heimerzheim, both of Fed. Rep. of Germany, assignors to Union Rheinische Braunkohlen Kraftstoff Aktiengesellschaft, Cologne, Fed. Rep. of Germany

Filed Feb. 19, 1985, Ser. No. 702,662
Claims priority, application Fed. Rep. of Germany, Feb. 23, 1984, 3406536
Int. Cl.[4] C07C 37/00
U.S. Cl. 568—804 10 Claims

1. A process for the conversion of mixtures of meta- and para-cresol and solutions which comprise mixtures of meta- and para-cresol into product ortho-cresol, para-cresol, 2,4-xylenol, 2,6-xylenol and 2,3,6-trimethylphenol which comprises:

(i) methylating meta-cresol and para-cresol in the ortho position by reacting the meta-cresol and para-cresol with methanol, dimethyl ether or a mixture thereof at a temperature of 270° to 450° C., at a pressure of atmospheric to 100 bar and in the presence of a catalyst bed without a residence time of 0.01 to 10 seconds, whereby a mixture of 2,3,6-trimethylphenol and 2,4,6-trimethylphenol is produced;

(ii) separating a portion of the reaction mixture of step (i) containing 2,4,6-trimethylphenol from the reaction mixture and subjecting the 2,4,6-trimethylphenol-containing portion to isomerization and transalkylation at a temperature of from 200° to 550° C. and at a pressure of from atmospheric to 300 bar for 0.2 to 10 hours in the presence of a catalytic amount of iron oxide, whereby methyl phenols are produced having 1 to 3 methyl groups and being substantially free from meta-substituted methylphenols.

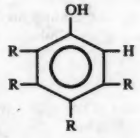
4,590,307

CATALYST PRECURSOR PREPARED FROM MANGANESE CARBONATE, AND USE OF A CALCINED DERIVATIVE IN AN ORTHO-ALKYLATION PROCESS

James G. Bennett, Jr., Glenmont, N.Y., and Freddie L. Tungate, Georgetown, Ind., assignors to General Electric Company, Pittsfield, Mass.

Division of Ser. No. 563,311, Dec. 20, 1983, Pat. No. 4,547,480.
This application Apr. 4, 1985, Ser. No. 719,762
Int. Cl.[4] C07C 37/16
U.S. Cl. 568—804 10 Claims

1. In a process for preparing an ortho-alkylated phenol by reacting in the vapor phase a branched or linear saturated alkyl alcohol having up to about 16 carbon atoms and one or more phenolic compounds represented by the formula



in which R is independently a monovalent substituent selected from the group consisting of hydrogen, C_1 to C_{12} alkyl, phenyl

and C_1 to C_{12} alkyl substituted phenyl, in the presence of an alkylation catalyst, the reaction being conducted at a temperature of at least 300° C. at atmospheric, subatmospheric or superatmospheric pressure using at least one mole of the alkyl alcohol for each ortho position in the phenolic compound to be alkylated, the improvement wherein the alkylation catalyst is a calcined product derived by heating a dry mixture of manganese carbonate and one or more magnesium containing materials selected from the group consisting of magnesium carbonate, basic magnesium carbonate and magnesium hydroxide.

4,590,308

SELECTIVE HALOGENATION OF BENZENE DI AND TRI-METHANOL COMPOUNDS

Alan T. Costello, Ashton-under-Lyne, and David J. Milner, Whitefield, both of England, assignors to Imperial Chemical Industries PLC, London, England

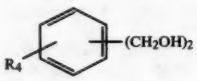
Filed Jan. 23, 1985, Ser. No. 694,161

Claims priority, application United Kingdom, Feb. 10, 1984, 8403548

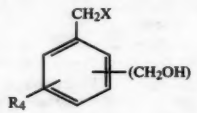
Int. Cl.⁴ C07C *33/46*

U.S. Cl. 568—812 **6 Claims**

1. A process for the monohalogenation of a compound of the formula (I)



in which each R, which may be the same or different, is fluorine or chlorine to form a compound of the formula (II):



in which X is bromine or chlorine and R has the meaning already given, which process comprises (a) reacting an aqueous solution of compound (I) with hydrochloric or hydrobromic acid in the presence of a water immiscible organic solvent which is inert to the reactants, the partition coefficient of compound (I) in the aqueous/organic phases being greater, with respect to the aqueous phase, than the partition coefficient of compound (II) and (b) separating the aqueous and organic layers and removing the organic solvent to obtain the compound (II).

4,590,309

PROCESS FOR THE PREPARATION OF PERFLUOROALKANOLS

Georges Cordier, Francheville, France, assignor to Rhone-Poulenc Specialites Chimiques, Courbevoie, France

Continuation of Ser. No. 596,939, Apr. 5, 1984, abandoned. This application Apr. 30, 1985, Ser. No. 727,621

Claims priority, application France, May 6, 1983, 83 07569

Int. Cl.⁴ C07C *29/136, 31/40*

U.S. Cl. 568—842 **31 Claims**

1. A process for the preparation of perfluoroalkanols by hydrogenation of the corresponding aliphatic perfluoroacids, which comprises reacting an aliphatic perfluoroacid of the formula:

$$C_nF_{2n+1}COOH$$

in which n is greater than or equal to 1, with hydrogen, in the presence of a catalyst based on a metal selected from the group consisting of ruthenium, rhodium, iridium and platinum, under a total pressure of between 1 and 50 bar and in the presence of at least one additive selected from the group consisting of a halide anion and a cation of any metal of columns IB, IIB, IVA, VA and VB of the periodic table of the elements, wherein said additive is present in an amount from 0.001 to 10 gram atoms per gram atom of catalyst metal.

4,590,310

PROCESS FOR THE PREPARATION OF 2,2,2-TRIFLUOROETHANOL

Palmer W. Townsend, Berkeley Heights; Chialang Huang, Edison, and Gerald G. Vernice, Nutley, all of N.J., assignors to The BOC Group, Inc., Montvale, N.J.

Filed Aug. 2, 1984, Ser. No. 636,882

Int. Cl.⁴ C07C *31/38*

U.S. Cl. 568—842 **54 Claims**

1. A continuous process for preparing 2,2,2- trifluoroethanol, said process comprising the steps of continuously providing 2-halo-1,1,1-trifluoroethane, a salt of a carboxylic acid and a hydroxylated compound to a reaction mixture in a reactor, wherein halo is selected from the group consisting of chloro, bromo and iodo; reacting said 2-halo-1,1,1-trifluoroethane, said carboxylic acid salt and said hydroxylated compound in said reactor at a reaction pressure at or above the autogenously developed pressure and at a reaction temperature of from about 223° C. to about the critical temperature of said hydroxylated compound thereby producing a reaction product mixture containing 2,2,2-trifluoroethanol; continuously withdrawing at least a portion of the reaction product mixture from the reactor; continuously separating unreacted 2-halo-1,1,1-trifluoroethane from the withdrawn reaction product mixture; continuously recycling the separated unreacted 2-halo-1,1,1-trifluoroethane as a part of the 2-halo-1,1,1-trifluoroethane provided to the reaction mixture, wherein said withdrawing, separating, and recycling are performed under pressure; and recovering the 2,2,2-trifluoroethanol from the remainder of the withdrawn reaction product mixture.

4,590,311

PROCESS FOR THE PREPARATION OF 1,4-BUTANEDIOL

Eit Drent, Amsterdam, Netherlands, assignor to Shell Oil Company, Houston, Tex.

Filed Oct. 24, 1984, Ser. No. 664,128

Claims priority, application Netherlands, Dec. 29, 1983, 8304475

Int. Cl.⁴ C07C *29/16, 31/20*

U.S. Cl. 568—852 **4 Claims**

1. In a process for the preparation of 1,4-butanediol by reaction of allyl alcohol with carbon monoxide and hydrogen in the presence of a soluble rhodium catalyst, a tertiary phosphine and a solvent, the improvement comprising (a) the tertiary phosphine is a phosphine of the general formula

$$P[(CH_2)_nR^1][(CH_2)_nR^2][(CH_2)_nR^3],$$

wherein R^1, R^2 and R^3 each represent a linear terminally bonded alkyl group containing not more than 16 carbon atoms and n is 2 and at least 5 mol phosphine is used per gram atom rhodium, and (b) the solvent is a carbonitrile of the general formula

$$R^4CH_2CH_2CH_2C{\equiv}N,$$

wherein R^4 represents an alkyl group containing 2 to 8 carbon atoms and the quantity of carbonitrile used per mol allyl alcohol is at least 1/5 mol.

4,590,312

PROCESS FOR PREPARING 2-ALKYL-1,4-BUTANEDIOLS

Richard E. Ernst, Kennett Square, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 502,317, Jun. 8, 1983, abandoned. This application Nov. 15, 1984, Ser. No. 671,873

Int. Cl.[4] C07C *29/00, 31/20, 29/17*

U.S. Cl. 568—861 9 Claims

1. A process for preparing a mixture of 1,4-butanediol and a 2-alkyl-1,4-butanediol, the process comprising bringing together, at an initial pH of 9–14, and a temperature and pressure suitable for reaction,

(a) hydrogen,

(b) a hydrogenation catalyst, and

(c) 1,4-butynediol or 1,4-butenediol, and an aldehyde of the structure

R—CHO

where R is hydrogen or an alkyl radical of 1–4 carbon atoms,

in a butynediol or butenediol/aldehyde weight ratio of 2/1 to 27/1.

4,590,313

METHOD FOR PRODUCING PRIMARY ALCOHOLS BY CATALYTIC HYDROGENATION OF TERMINAL EPOXIDES

Roger A. Grey, West Chester; John F. White, Villanova, and Eva M. Beals, Washington Crossing, all of Pa., assignors to Atlantic Richfield Company, Los Angeles, Calif.

Filed Jun. 2, 1982, Ser. No. 384,318

Int. Cl.[4] C07C *29/132, 31/10, 31/12*

U.S. Cl. 568—907 2 Claims

1. A method for hydrogenating terminal epoxides, comprising a mono-substituted epoxy ring and having from 3 to 6 carbon atoms per molecule, to form the corresponding primary alcohol, which method comprises contacting the epoxide with hydrogen gas and a solid catalyst comprising Raney cobalt and a solid, substantially inert diluent comprising an alkaline metal halide, the weight ratio of Raney cobalt to said diluent being within the range of about 1:1 to 1:100, at a temperature between 25° C. and 250° and at a pressure sufficient to maintain the epoxide reactant and product alcohol in the vapor phase.

4,590,314

CATALYTIC PROCESS FOR THE PRODUCTION OF ALCOHOLS FROM CARBON MONOXIDE, HYDROGEN AND OLEFINS

Nancy E. Kinkade, St. Albans, W. Va., assignor to Union Carbide Corporation, Danbury, Conn.

Continuation-in-part of Ser. No. 567,244, Dec. 30, 1983, abandoned. This application Nov. 19, 1984, Ser. No. 671,886

Int. Cl.[4] C07C *29/16, 31/12*

U.S. Cl. 568—909 18 Claims

1. A process for producing selectively C_{n+1} alcohols, wherein n is a positive integer of at least 2, comprising reacting in the vapor phase a gas feed of at least one C_n olefin with carbon monoxide and hydrogen in the presence of a solid catalyst consisting essentially of molybdenum sulfide and an alkali compound selected from the group consisting of alkali metal and alkaline earth metal compounds and mixtures thereof, and wherein the reaction gas hourly space velocity is from about 1,000 to about 24,000 hour^{-1}.

4,590,315

PROCESS FOR THE PREPARATION OF HALO AROMATIC COMPOUNDS

James J. Maul, Grand Island, and David Y. Tang, Amherst, both of N.Y., assignors to Occidental Chemical Corporation, Niagara Falls, N.Y.

Filed Oct. 15, 1984, Ser. No. 660,765

Int. Cl.[4] C07C *17/20, 17/22*

U.S. Cl. 570—127 14 Claims

1. A process for the preparation of 3-chloro-4,5-difluorobenzotrifluoride which comprises the steps of

(A) reacting an alkali metal fluoride with 4-chloro-3,5-dinitrobenzotrifluoride to form 4-fluoro-3,5-dinitrobenzotrifluoride;

(B) chlorodenitrating the 4-fluoro product of step (A) to form 3,5-dichloro-4-fluorobenzotrifluoride; and

(C) reacting the 3,5-dichloro-4-fluorobenzotrifluoride compound prepared in step (B) with an alkali metal fluoride to form 3-chloro-4,5-difluorobenzotrifluoride.

4,590,316

METHOD OF SAFELY PREPARING GRAPHITE FLUORIDE

Yasushi Kita; Hisaji Nakano; Shiro Moroi, and Akira Sakanoue, all of Ube, Japan, assignors to Central Glass Company, Limited, Ube, Japan

Continuation of Ser. No. 449,588, Dec. 14, 1982. This application Sep. 14, 1984, Ser. No. 650,986

Claims priority, application Japan, Dec. 17, 1981, 56-202564

Int. Cl.[4] C07C *17/00*

U.S. Cl. 570—150 11 Claims

1. In a method of preparing a graphite fluoride by heterogeneous contact reaction between a solid carbon material in finely divided form and a gas comprising a mixture of 50-70% by volume of fluorine gas and 30-50% by volume of another gas which is inactive to said carbon material, the method having the steps of:

placing said carbon material in a reaction zone of a reactor;

introducing said gas into said reaction zone while said carbon material is kept heated such that said gas flows through said reaction zone and contacts and reacts with said carbon material;

allowing said gas to flow out of said reaction zone and recirculating said gas through said reaction zone, wherein gaseous higher fluorocarbons having more than 4 carbon atoms are formed in the gas phase in said reaction zone during the reaction, the improvement comprising the steps of:

(a) measuring at intervals the totals concentration of said gaseous higher fluorocarbons in the gas flowed out of said reaction zone; and

(b) removing at least a portion of said gaseous higher fluorocarbons from the gas flowed out of said reaction zone prior to the recirculation of said gas so as to control the total concentration of said gaseous higher fluorocarbons in said gas phase and to maintain the total concentration of said gaseous higher fluorocarbons in said gas phase at or less than 3% by volume to thereby prevent violent decomposition of graphite fluoride which is formed by the reaction and exits in the reaction zone.

4,590,317

PROCESS FOR MINIMIZING CORROSION AND COKING IN AN ETHYLENE DICHLORIDE PLANT

John P. Lenczyk, Akron, Ohio, assignor to The B. F. Goodrich Company, Akron, Ohio

Filed Aug. 6, 1984, Ser. No. 637,982

Int. Cl.[4] C07C *17/00*

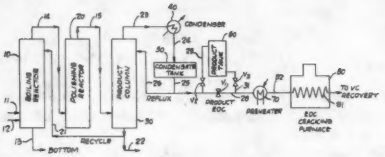
U.S. Cl. 570—220 9 Claims

1. A process for reducing coking of an ethylene dichloride cracking furnace, corrosion of steel process equipment upstream of said furnace through which said ethylene dichloride

is flowed, and other deleterious side effects due to the presence of trace amounts of ferric chloride and/or free chlorine in a gaseous feed to said furnace from a ferrous metal boiling reactor in which ethylene is directly chlorinated in the presence of a ferric chloride catalyst in boiling ethylene dichloride, said process comprising,

(a) operating said boiling reactor with from 0.05% to 2% excess ethylene over the stoichiometric amount required to produce ethylene dichloride,

(b) introducing the product consisting essentially of ethylene dichloride, contaminant amounts of oxygen, polychlorinated compounds each present in an amount less than about 0.5% by wt based on the weight of effluent flowed to the reactor, from 100 ppm to less than 524 ppm of free chlorine, and from 5 to 50 times as much ethylene as there is free chlorine, into a polishing reactor at a temperature in the range of from about 85° C. to about 130° C.



and an inlet pressure in the range from greater than 1 atm to about 1.4 atm,

(c) contacting said feed in said polishing reactor with a fixed bed of catalyst consisting essentially of tubular sections of a catalyst support selected from gamma alumina and titania optionally containing from about 5% to about 20% by wt of copper chloride or ferric chloride, said tubular sections having an outer surface area per unit volume of packed catalyst, of less than 7.8 cm^2/ml, and a wall thickness in the range from 2.5 mm to 6.5 mm,

(d) maintaining a pressure drop of less than 10 psi through said polishing reactor,

(e) evolving from said polishing reactor an essentially chlorine-free effluent having less than 10 ppm Fe present as $FeCl_3$, less than 20 ppm free chlorine and at least about 500 ppm ethylene, and,

(f) introducing said essentially chlorine-free effluent into a cracking furnace to produce vinyl chloride.

4,590,318

METHOD FOR PRODUCING VINYL CHLORIDE

David A. Longhini, Uniontown, Ohio, assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Nov. 23, 1984, Ser. No. 674,192

Int. Cl.[4] C07C *17/34, 21/06*

U.S. Cl. 570—220 **21 Claims**

1. In a method for producing vinyl chloride by pyrolysis of 1,2-dichloroethane wherein:

(a) 1,2-dichloroethane is pyrolyzed in a heated furnace to produce at least one stream comprising vinyl chloride and 1,2-dichloroethane, and

(b) said stream is removed from said furnace and then introduced to essentially unheated conduit means to establish a stream flowing in said conduit means,

the improvement comprising introducing to said stream in said conduit means a pyrolysis-promoting amount of promoter and utilizing sensible heat of said removed stream in said conduit means to pyrolyze 1,2-dichloroethane to produce vinyl chloride.

4,590,319

METHOD FOR THE PARTIAL HYDROGENATION OF CONJUGATED DIENES

Naoshi Imaki, Atsugi, and Yoshiko Fukumoto, Yokohama, both of Japan, assignors to Mitsubishi Chemical Industries, Ltd., Tokyo, Japan

Filed Feb. 26, 1985, Ser. No. 705,526

Claims priority, application Japan, Mar. 6, 1984, 59-42265; Jun. 19, 1984, 59-126197; Jun. 22, 1984, 59-128483; Jan. 23, 1985, 60-10376; Jan. 23, 1985, 60-10377; Jan. 24, 1985, 60-11325; Jan. 24, 1985, 60-11326; Jan. 29, 1985, 60-15226

Int. Cl.[4] C07C *5/05*

U.S. Cl. 585—274 **10 Claims**

1. A method for the partial hydrogenation of conjugated dienes, characterized in that a chain conjugated diene in which the conjugated two double bonds have different numbers of substituents, is hydrogenated at a temperature of not higher than 50° C. in the presence of a catalyst composed essentially of (1) a cobalt compound, (2) an organophosphine compound and (3) an aluminum compound, to obtain a partially hydrogenated product wherein as between said conjugated two double bonds, the one having a greater number of substituents is selectively hydrogenated.

4,590,320

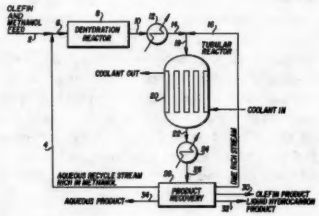
CONVERSION OF METHANOL TO OLEFINS IN A TUBULAR REACTOR WITH LIGHT OLEFIN CO-FEEDING

Ajit V. Sapre, West Deptford, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation of Ser. No. 646,262, Aug. 31, 1984, abandoned. This application Aug. 14, 1985, Ser. No. 765,579

Int. Cl.[4] C07C *1/20*

U.S. Cl. 585—324 **25 Claims**



1. In the process of converting a feed comprising at least one lower aliphatic alcohol having from 1 to 3 carbon atoms and/or corresponding ethers of such alcohols, alone or in admixture with water, into a predominantly olefinic hydrocarbon product comprising at least 50 wt. % olefins, wherein said feed is contacted with a dehydration catalyst at elevated temperatures in a first reaction zone comprising a dehydration reactor to obtain a product comprising a mixture of water and at least one ether, and said product from said first reaction zone is thereafter contacted with a crystalline silicate zeolite in a second reaction zone at elevated temperatures and under exothermic reaction conditions to obtain said hydrocarbon products comprising olefins, said zeolite being a zeolite having a silica-to-alumina ratio of at least about 12, and a Constraint Index of about 1 to 12, and said second reaction zone comprising a tubular reactor wherein said crystalline silicate zeolite is confined within a plurality of adjacent elongated tubular reaction zones, the improvement comprising cofeeding with said feed about 0.5–3% by weight of said feed a light olefin to said dehydration reactor to stabilize the conversion operation.

4,590,321

AROMATIZATION REACTIONS WITH ZEOLITES CONTAINING PHOSPHORUS OXIDE

Chin-Chiun Chu, North Brunswick, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jun. 12, 1985, Ser. No. 744,072
Int. Cl.[4] C07C *1/20, 2/00*
U.S. Cl. 585—415 12 Claims

1. A process for producing aromatic hydrocarbons, said process comprising contacting a feedstock comprising one or more non-aromatic compounds selected from the group consisting of C_2–C_{12} alkanes, C_2–C_{12} alkenes, C_1–C_5 alcohols and C_2–C_{12} ethers with a catalyst comprising a crystalline zeolite material having the structure of ZSM-5 or ZSM-11, said contacting taking under aromatization conditions including a temperature of from about 200° C. to about 700° C., a pressure of from about 0.1 atmosphere to about 60 atmospheres, a weight hourly space velocity (WHSV) of from about 0.1 to about 400 and a hydrogen/hydrocarbon mole ratio of from about 0 to about 20, said catalyst further comprising an oxide of phosphorus which has been incorporated into said catalyst by a process comprising the steps of:

(i) impregnating said zeolite with a source of phosphate ions; and

(ii) calcining the impregnated zeolite of step (i) under conditions sufficient to convert said impregnated phosphate ions to said oxide of phosphorus.

4,590,322

USE OF HYDROGEN SULFIDE TO IMPROVE BENZENE PRODUCTION OVER ZEOLITES

Chin-Chiun Chu, North Brunswick, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jun. 12, 1985, Ser. No. 744,073
Int. Cl.[4] C07C *2/00*
U.S. Cl. 585—415 7 Claims

1. A process for producing aromatic hydrocarbons, said process comprising contacting a feedstock comprising one or more of ethylene, propane and propylene with a catalyst comprising a crystalline zeolite material having the structure of ZSM-5 or ZSM-11, said contacting taking place under sufficient aromatization conditions including a temperature of from about 100° C. to about 700° C., a pressure of from about 0.1 atmosphere to about 60 atmospheres, a weight hourly space velocity (WHSV) of from about 0.1 to about 400 and a hydrogen/hydrocarbon mole ratio of from about 0 to about 20, said feedstock further comprising from about 2 to about 50 volume percent of hydrogen sulfide in an amount sufficient to increase the proportion of benzene in the aromatic hydrocarbons produced.

4,590,323

CONVERSION OF PARAFFINS TO AROMATICS OVER ZEOLITES MODIFIED WITH OXIDES OF GROUP IIIA, IVA AND VA ELEMENTS

Chin-Chiun Chu, North Brunswick, N.J., assignor to Mobil Oil Corporation, New York, N.Y.

Filed Jun. 12, 1985, Ser. No. 744,086
Int. Cl.[4] C07C *2/00*
U.S. Cl. 585—417 13 Claims

1. A process for producing aromatic hydrocarbons, said process comprising contacting one or more C_2–C_{12} alkanes with a catalyst comprising a crystalline zeolite material having the structure of ZSM-5 or ZSM-11, said contacting taking place under aromatization conditions including a temperature of from about 200° C. to about 700° C., a pressure of from about 0.1 atmosphere to about 60 atmospheres, a weight hourly spaced velocity (WHSV) of from about 0.1 to about 400 and a hydrogen/hydrocarbon mole ratio of from about 0 to about 20, said catalyst further comprising an oxide of a Group IIIA, IVA or VA element, said oxide being incorporated into said catalyst by a modification process comprising the steps of:

(i) contacting said ZSM-5 or ZSM-11 with a solution or neat liquid of a compound of said Group IIIA, IVA or VA element, thereby impregnating said ZSM-5 or ZSM-11 with said compound; and

(ii) heating said impregnated ZSM-5 or ZSM-11 or step (i) for at least one hour at a temperature of at least 150° C.

4,590,324

DEHYDROGENATION OF ALKYLAROMATICS

Larry C. Satek, Wheaton, Ill., assignor to Amoco Corporation, Chicago, Ill.

Filed Mar. 11, 1985, Ser. No. 710,043
Int. Cl.[4] C07C *2/64*
U.S. Cl. 585—444 12 Claims

1. A method of dehydrogenating an alkylaromatic compound containing at least two carbon atoms in at least one alkyl group to an alkenylaromatic which comprises contacting the alkylaromatic with a catalyst comprising copper on a support comprising aluminum borate.

4,590,325

CATALYST COMPONENT FOR POLYMERIZATION OF OLEFINS

Masafumi Imai; Tadashi Yamamoto; Hiroyuki Furuhashi; Hiroshi Ueno, and Naomi Inaba, all of Saitama, Japan, assignors to Toa Nenryo Kogyo Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 642,457, Aug. 20, 1984, Pat. No. 4,550,095.
This application Aug. 15, 1985, Ser. No. 765,765
Claims priority, application Japan, Aug. 30, 1983, 58-157091
Int. Cl.[4] C07C *2/08, 2/26*
U.S. Cl. 585—512 7 Claims

1. A process for the polymerization of olefins which comprises homopolymerizing an olefin or copolymerizing ethylene with an alpha-olefin or copolymerizing at least two different alpha-olefins in the presence of a catalyst system comprising:

(1) a titanium based catalyst component obtained by

(i) reacting (A) Mg(OR)(OR′) with (B) a silicon compound having at least one silicon-hydrogen bond,

(ii) contacting the reaction product with (C) an electron donor compound,

(iii) contacting the resulting contact product two or more times with (D) a titanium halide, and,

(iv) between at least one of the multiple titanium halide contacts, contacting the titanium halide contacted solid with a halogenated hydrocarbon, wherein R and R′ are radicals selected from alkyl, alkenyl, cycloalkyl, aryl, and aralkyl radicals and R and R′ may be the same or different;

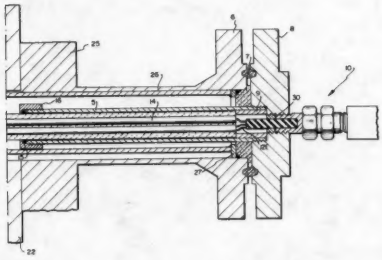
(2) an organoaluminum cocatalyst.

4,590,326

MULTI-ELEMENT THERMOCOUPLE

Paul N. Woldy, Houston, Tex.; John S. Stevenson, Los Angeles, Calif., and William E. Preston, Houston, Tex., assignors to Texaco Inc., White Plains, N.Y.

Filed Jun. 14, 1984, Ser. No. 620,664
Int. Cl.[4] H01L *35/02*
U.S. Cl. 136—233 8 Claims



1. A thermocouple assembly for introducing thermocouple junctions, each having a pair of thermocouple leads, horizontally through a thermowell in the shell of a reactor vessel, said vessel containing a high temperature fluid whose temperature is to be measured, said thermocouple leads extending through a plurality of refractory courses lining said shell, said courses including an innermost hot face course exposed to said high temperature fluid and said thermowell having an aperture flange and a mating closure flange containing means for sealing and insulating said thermocouple leads and passing said leads through said closure flange, comprising

a plurality of pairs of thermocouple leads, each pair having a thermocouple junction at a junction end thereof and a thermocouple exit end opposed to said junction end, said pairs being bundled together with their junction ends longitudinally displaced from each other,

a matrix of refractory material surrounding and supporting said thermocouple leads over the entire length thereof from said exit ends to said junction ends,

said matrix having an exit end surrounding said thermocouple leads exit ends and a junction end surrounding said thermocouple leads junction ends,

a sheath surrounding and protecting said matrix from the exit end thereof to a section of said matrix adjacent said hot face course, said sheath having an exit end surrounding said matrix exit end and a hot face end surrounding said matrix section adjacent said hot face course, and

a support sleeve internal to said sheath and surrounding said matrix from said matrix exit end to a section of said matrix intermediate said matrix exit and junction ends,

said support sleeve loosely fitting over said matrix and having an exit end where it surrounds said matrix exit end and an opposed end where it surrounds said matrix intermediate section.

said support sleeve having at said opposed end a male threaded portion with a packing nut and contained packing thereon for gripping said matrix when said nut is drawn up on said male threaded portion,

said matrix being supported at said intermediate section thereof by said packing when said packing nut is drawn up on said male threaded portion of said support sleeve,

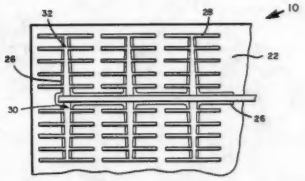
said sheath being attached at its exit end to said thermowell aperture flange in upwardly displaced off-center alignment with respect to said matrix so that said sheath is not contacted by a hot refractory course as it thermally expands upwardly during operations within said reactor vessel, said sheath further having an annular plug of refractory material within its hot face end, said annular plug having an inside diameter slightly larger than the outside diameter of said matrix, said plug acting to block the transmission of heat from said high temperature fluid to lower temperature portions of said thermocouple assembly.

4,590,327

PHOTOVOLTAIC DEVICE AND METHOD

Prem Nath, Rochester; Timothy J. Barnard, Lake Orion, and Dominic Crea, Mt. Clemens, all of Mich., assignors to Energy Conversion Devices, Inc., Troy, Mich.

Filed Sep. 24, 1984, Ser. No. 653,801
Int. Cl.[4] H01L *31/06, 31/18*
U.S. Cl. 136—256 105 Claims



1. A photovoltaic device comprising:

an electrically conductive substrate layer;

a semiconductor body deposited upon said substrate layer;

a transparent conductive layer over at least a portion of said semiconductor body for facilitating collection of electrical current produced by the photovoltaic device; and

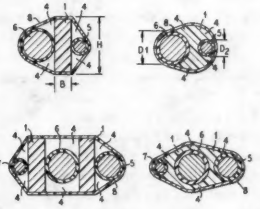
a bus-grid structure, in contact with said conductive layer, said bus-grid structure comprising a current collecting portion comprising grid fingers and a current carrying portion comprising a busbar structure for carrying current collected by said current collecting portion, the entirety of said current carrying portion which overlies the semiconductor body being electrically insulated from said semiconductor body by a layer of solid material.

4,590,328

PLASTIC SEALING PLUGS FOR CABLE FITTINGS

Dieter Kunze, Neuried, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed Mar. 9, 1984, Ser. No. 588,150
Claims priority, application Fed. Rep. of Germany, Mar. 22, 1983, 3310377
Int. Cl.[4] H02G *15/04*
U.S. Cl. 174—88 R 6 Claims



1. A cable fitting comprising:

a heat shrinkable cable fitting,

a plurality of cables which may be of varying diameters, said cables having parallel axes in the fitting,

a filling piece of plastic sealing material for sealing the gore areas between said cables,

said filling piece having a longitudinal expanse and an approximately rectangular cross-sectional shape in a plane perpendicular to said longitudinal expanse,

said longitudinal expanse adapted to lie parallel to said cable axes and including longitudinal surfaces, some of which are to be contacted by said cables,

said rectangular cross-sectional shape being dimensioned such that one lateral expanse, as the height of said filling piece, is at least as great as a diameter of a smallest of said cables but is not more than four times as large as a diameter of a largest of said cables, and such that a second lateral expanse, as the width of said filling piece, is greater than half the diameter of the smallest cable but smaller than the diameter of the largest cable,

at least one of said lateral expanses being greater intermediate to the longitudinal ends of said piece than at the ends of said piece,

said longitudinal surfaces not contacted by said cables being surrounded by a tensile band consisting of heat-resistant material.

4,590,329

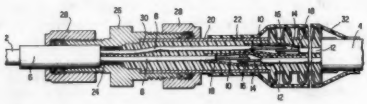
PROTECTIVE ENCLOSURE FOR SPLICE CONNECTION

Lawrence M. Potochnik, Washington Township, Washington County, and Kenneth F. Semethy, N. Versailles, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 18, 1985, Ser. No. 692,948

Int. Cl.[4] H02G *15/08*

U.S. Cl. 174—88 R **5 Claims**



1. In a nuclear power plant containment structure including: a hardline cable composed of a rigid sheath and at least one conductor enclosed by the rigid sheath and including a first conductive wire and a layer of insulation enclosing the first conductive wire; a softline cable composed of a flexible sheath and at least one conductor enclosed by the flexible sheath and including a second conductive wire and a layer of insulation enclosing the second conductive wire; a connector establishing a splice connection electrically and mechanically connecting the first and second conductive wires together; and a protective enclosure surrounding the connector, the improvement wherein said protective enclosure comprises:

cover means extending between, and secured to, said rigid sheath and said flexible sheath, said cover means including a flexible stainless steel tube enclosing said connector and provided with axially spaced annular corrugations which impart flexibility to said tube, and a reducing union connecting said flexible tube to said rigid sheath;

a mass of flexible potting material surrounding said connector, filling the interior of said reducing union and enclosed by said flexible tube for isolating said connector and said first and second conductive wires from the external environment;

a first length of tubing of a heat-shrinkable material surrounding said connector and extending to said layers of insulation enclosing said first and second conductive wires, said first length of tubing being heat shrunk to conform closely to said layers of insulation; and

a second length of tubing of a heat-shrinkable material surrounding said flexible tube and being heat shrunk to conform closely to said flexible tube.

4,590,330

PRINTER

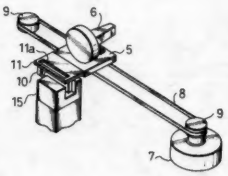
Takashi Goto, Tamayama, and Katsuhiko Hirayama, Takizawa, both of Japan, assignors to Alps Electric Co., Ltd., Japan

Filed Nov. 1, 1984, Ser. No. 667,215

Claims priority, application Japan, Nov. 1, 1983, 58-168455[U]

Int. Cl.[4] H04L *15/26*

U.S. Cl. 178—4 **3 Claims**



1. A printer comprising:

(a) a carriage supporting a print head and movable across print paper for enabling the print head to print on the print paper;

(b) a fixed frame;

(c) a switch device mounted on one of said carriage and said fixed frame, said switch device being composed of light transmission means and light blocking means for blocking light passing through said light transmission means;

(d) sensor means on the other of said carriage and said fixed frame for sensing light passing through said switch device to produce an electric signal; and

(e) means for reading said electric signal as information indicative of printer functions in response to movement of said carriage.

4,590,331

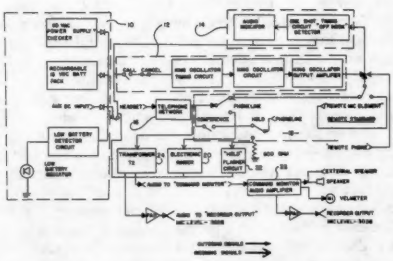
HOSTAGE NEGOTIATION TELEPHONE SYSTEM

Joseph P. Nunemaker, Lanham, and Samuel Hicks, New Carrollton, both of Md., assignors to Security Systems International, Inc., Lanham, Md.

Filed Mar. 13, 1984, Ser. No. 588,991

Int. Cl.[4] H04M *9/00*

U.S. Cl. 179—5 R **9 Claims**



1. A telephone system for hostage negotiation or other crisis comprising:

a self-contained power supply means;

a microphone and speaker means for a negotiator whereby a negotiator can talk into and hear from the system;

a receiver means for a coach whereby a coach can hear from the system;

a telephone dialing means which stores a last telephone number called and is capable of retransmitting said last number called at the push of a button;

an automatic interrupted telephone ringing means for ringing a perpetrator's telephone by a single push of a button;

an off hook detector which senses if the perpetrator's telephone is off hook and generates an off hook signal in response thereto, the off hook signal is directed to the automatic interrupted telephone ringing means for switching off the ringing means;

an off hook indicator means for alerting a negotiator that the perpetrator's telephone is off hook in response to the off hook signal;

means for connecting said system to a standard telephone at a hostage-taking site for use as the perpatrator's telephone;

means for connecting said system to a telephone line to a local telephone network;

means for connecting together the microphone and speaker means, the perpatrator's telephone and the telephone line to form a conference call between a negotiator, a perpetrator and a third-party; and

means for mixing audio signals and power to the system.

4,590,332

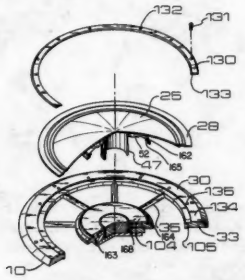
PHASE COHERENT LOW FREQUENCY SPEAKER

Pascal Delbuck, 31220 La Baya #110, Westlake Village, Calif. 91362

Continuation-in-part of Ser. No. 496,957, May 23, 1983, abandoned. This application Sep. 24, 1984, Ser. No. 653,781

Int. Cl.[4] H04R *1/24, 9/04, 9/06*

U.S. Cl. 179—115.5 PS **23 Claims**



1. An improved loudspeaker construction combination comprising:

a one piece planar support component, having a top plate and an

exterior first face, an interior second face, and having

an exterior planar peripheral frame having regular geometry frontal dimensions, said frame having not more than eight mounting holes regularly disposed through said frame, said frame having an inner and outer edge,

multiple spokes extending radially inwardly from said peripheral frame at uniform angular positions,

said multiple spokes being less than nine in number,

said multiple spokes integrally secured to said peripheral frame, each said multiple spoke having triangular cross section with one apex of each cross section facing said support components first face,

a circular hub integrally secured to said multiple spokes angularly converging on said top plate, said hub having an exterior hub bevel edge adjacent said multiple integral spokes, said hub having a central circular aperture disposed therethrough, said hub having an adaptively sized circular recess centrally disposed in the second face of said hub,

a planar back plate adaptively size and having a first planar face and a second planar face,

a circular permanent planar ring magnet having first and second planar faces, said first face of said magnet bonded to said first face of said back plate by a permanent bonding agent,

a pole piece adaptively sized and concentrically fitting into the inner ring of said ring magnet, permanently bonded by a bonding agent on the pole piece first face to said first face of said back plate, providing a concentric annular free channel volume between said pole piece and said ring magnet,

aforesaid planar back plate and bonded ring magnet and bonded pole piece are adaptively permanently bonded onto the second face of said top plate

a convex shallow depth cone diaphragm having a peripheral edge bonded by a permanent cement to said inner edge of said peripheral frame, said convex cone diaphragm having a central exterior cone apex, a first exterior face and a second interior face, and,

a tubular thin voice coil having a voice coil first terminus secured by a permanent bonding to the interior second face of said diaphragm, said thin voice coil being concentrically disposed and secured in said face channel volume, providing audio vibrational excursions of said bonded coil and diaphragm on receiving electrical signals in said voice coil,

said loud speaker construction providing a phase coherent audio signal.

4,590,333

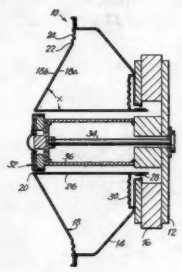
MULTIDRIVER LOUDSPEAKER

John Strohbeen, 160 Bergen St., Brooklyn, N.Y. 11217

Filed Jun. 14, 1984, Ser. No. 620,419

Int. Cl.[4] H04R *1/24, 19/00*

U.S. Cl. 179—115.5 PS **8 Claims**



1. A multidriver loudspeaker comprising a low frequency driver having an inverted speaker cone, and an elongated voice coil former secured at one end to said inverted speaker cone, said low frequency driver having a virtual acoustical source which is the perceived origin of the sound emanating from the driver, said virtual acoustical source of said low frequency driver located along the voice coil former at a point proximate to the junction of said voice coil former and said inverted speaker cone, a high frequency driver having a virtual acoustical source, said high frequency driver located inside the voice coil former at a point proximate to the junction of said voice coil former and said inverted speaker cone so that the virtual acoustical source of said high frequency driver is at approximately the same location as the virtual acoustical source of said low frequency driver.

4,590,334

SUPPLY CIRCUIT INCLUDED IN A DC-MAGNETIZED HYBRID TRANSFORMER

Ivan Jaki, Norsborg, Sweden, assignor to Telefonaktiebolaget LM Ericsson, Stockholm, Sweden

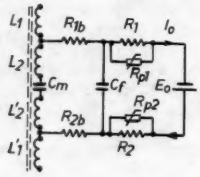
PCT No. PCT/SE83/00101, § 371 Date Nov. 8, 1983, § 102(e) Date Nov. 8, 1983, PCT Pub. No. WO83/03504, PCT Pub. Date Oct. 13, 1983

PCT Filed Mar. 22, 1983, Ser. No. 556,243

Claims priority, application Sweden, Apr. 1, 1982, 8202104

Int. Cl.[4] H04B *3/30, 1/52*

U.S. Cl. 179—170 D **4 Claims**



1. A supply circuit for a DC-magnetized hybrid transformer connected between two and four wire lines said transformer having two winding sections which are AC-coupled and each having a supply terminal, said supply circuit comprising a current supply having first and second output terminals, and first and second resistance means coupling one of said output terminals to one of said supply terminals respectively, each of said resistance means comprising a current-feed resistor serially connected to a resistor network including a PTC-resistor.

4,590,335

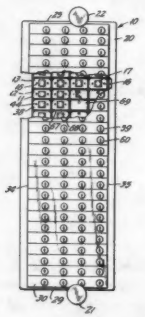
TEST SHOE FOR TELEPHONE CONNECTOR BLOCKS HAVING MODULE RETRACTION MEANS

Paul V. De Luca, Plandome Manor, and Peter Hung, Huntington, both of N.Y., assignors to Porta Systems Corp., Syosset, N.Y.

Filed Oct. 26, 1984, Ser. No. 665,459

Int. Cl.[4] H01R *13/629*; H04M *1/24*

U.S. Cl. 179—175 **5 Claims**



1. In an improved test shoe for testing individual telephone subscriber circuits interfaced at a telephone protector block, said block having recesses mounting individual protector modules for each subscriber circuit, said modules having test points on an outer surface thereof accessible to corresponding resiliently mounted pins on said shoe, said modules having a handle member thereon disposed between said test points, said modules being longitudinally removable between fully engaged and detent positions, the improvement comprising: said test shoe having a plurality of slidably mounted jack elements each positioned to overlie an end surface of a protector module in an area adjacent the handle member thereof; said jack elements having manually engagable means on an outer end thereof, and means on an inner end thereof selectively engagable with the handle member of an underlying protector module for the transmission of axially directed motion thereto; whereby, said jack elements may selectively move an underlying protector module between said fully engaged and detent positions without the necessity of first removing said test shoe from engagement with said lock.

4,590,336

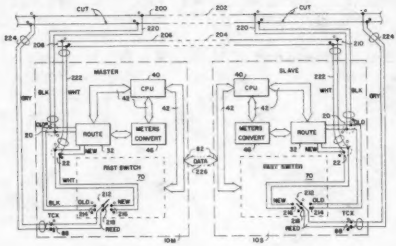
SPECIAL CIRCUIT TRANSFER VIA CABLE ANALYZER

Jimmy C. Ray, and H. Wayne Mathews, both of Denison, Tex., assignors to Communications Technology Corp., Los Angeles, Calif.

Filed Nov. 8, 1984, Ser. No. 669,767

Int. Cl.[4] H04B *3/46*

U.S. Cl. 179—175.3 A **10 Claims**



1. The process involving transferring a communication circuit from

a. an old section of a pair of wires to a new section of a pair of wires,

b. one end of the old section and new section being adjacent to each other and designated as the master end and

c. the other end of each section being adjacent and designated as the slave end,

d. each pair of wires having one designated as ring and the other as tip;

e. wherein the improved method comprises the steps of:

f. placing a master double pole double throw relay at the master end, one pair of the poles designated as old poles and one pair of poles designated as new poles, each pair having a ring pole and a tip pole, and the reed contacts designated as ring reed and tip reed,

ii. placing a slave double pole double throw relay at the slave end, one pair of the poles designated as old poles and one pair of poles designated as new poles, each pair having a ring pole and a tip pole, and the reed contacts designated as ring reed and tip reed,

g.

i. connecting the master relay old pair of poles to the old pair master end inboard thereof, ring pole to ring and tip pole to tip;

ii. connecting the slave relay old pair of poles to the slave end of an old pair believed to be the same pair as to which the master relay is connected, inboard thereof, ring pole to ring and tip pole to tip;

h.

i. connecting the master relay reed contacts to the master end of the old pair, outboard thereof, ring reed to ring and tip reed to tip;

ii. connecting the slave relay reed contacts to the slave end of the old pair to which the slave poles are connected, outboard thereof, ring reed to ring and tip reed to tip;

j.

i. connecting the master relay new pair of poles to the

master end of the new pair, ring pole to ring and tip pole to tip;

ii. connecting the slave relay new pair of poles to the slave end of the new pair, ring pole to ring and tip pole to tip;

k. with each of the master and slave relay reeds contacting the old pair of poles,

i. cutting each of the wires of the old pair at the master end between the pole and reed connections,

ii. cutting each of the wire of the old pair at the slave end between the pole and reed connections,

l. after the both wires have been cut on both ends of the old cable pair, simultaneously moving the reeds of the master and slave relays from the old poles to the new poles, then

m.

i. splicing the new pair at the master end to the old pair at the reed connection, ring to ring and tip to tip,

ii. splicing the new pair at the slave end to the old pair at the reed connection, ring to ring and tip to tip, and finally,

n. disconnecting the wires from the master and slave relays.

4,590,337

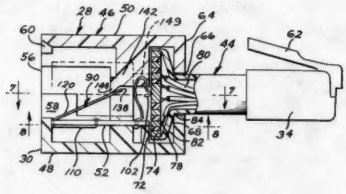
ROTATABLE ELECTRICAL CONNECTOR FOR COILED TELEPHONE CORDS

Anthony R. Engelmore, 14001 Harbour Pl., Prospect, Ky. 40059

Filed Nov. 28, 1984, Ser. No. 676,031

Int. Cl.[4] H04R *1/06;* **H01R** *39/00;* **H02G** *11/00*

U.S. Cl. 179—186 **22 Claims**



1. A low friction rotatable electrical connector for use with coiled telephone cords, said connector comprising:

a. a hollow insulated housing having a first plurality of electrical terminal means at one end, and a circular opening in the end wall at the opposite end of the housing;

b. a rotor assembly of insulating material rotatably mounted within the said circular opening so the rotor assembly may rotate freely relative to the hollow housing, and a second plurality of electrical terminal means associated with the rotor assembly;

c. the end of the rotor assembly within the housing having a transverse face supporting a plurality of concentric electrical contact rings that are spaced apart by insulating material, each contact ring being connected to a separate one of the second plurality of electrical terminal means;

d. a plurality of spring wire contact elements each mounted at one end within the housing so the contacts are arranged in a parallel array, each spring wire contact element having a portion biased into continuous wiping contact with a separate one of said concentric rings for making a reliable electrical connection between the relatively movable hollow housing and its rotor assembly;

e. each of said plurality of spring wire contact elements being of hairpin shape at its intermediate portion, the said housing having partitions interposed between the intermediate portions of the spring wire contact elements so as to stabilize and space these wire contact elements apart.

4,590,338

SWITCH FOR ADJUSTABLY TILTING MIRROR MEMBERS OF OUTER MEMBERS

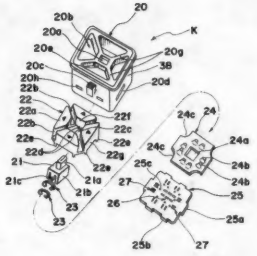
Masaru Suzuki, Chiryu, Japan, assignor to Kabushiki Kaisha Tokai Rika Denki Seisakusho, Aichi, Japan

Filed Jul. 16, 1984, Ser. No. 631,224

Claims priority, application Japan, Jul. 16, 1983, 58-110766[U]

Int. Cl.[4] H01H *3/00*

U.S. Cl. 200—5 R **7 Claims**



7. A switch for controlling a multi-mode operation comprising:

a switch casing having an upper rib structure providing a central opening and four peripheral openings spaced respectively by four diagonal ribs;

a knob body mounted in the switch casing with a quadrifed push plate, the push plate extending respectively into each of the peripheral openings and having lower extensions to provide a tilting fulcrum for the push plate during a switching operation;

a changeover switch mechanism mounted in the central opening of the switch casing to connect the push plate with at least one set of a plurality of electrical contact sets;

a first set of electrical contacts mounted on a resilient movable contact holder in the switch casing and operatively positioned adjacent the bottom of the knob body,

a second set of electrical contacts is mounted on a substrate beneath the movable contact holder, whereby depression of the push plate provides a tilting movement to activate at least a first electrical contact with a pair of second electrical contacts to activate one of the modes of operation.

4,590,339

JOYSTICK

Dennis L. Scott-Jackson, Burnaby; Grant N. Russell, New Westminster, and Eric J. Richards, Burnaby, all of Canada, assignors to Gravis Computer Peripherals Inc., Burnaby, Canada

Filed Feb. 19, 1985, Ser. No. 702,575

Int. Cl.[4] H01H *25/00;* **G05G** *9/04;* **H01C** *10/16*

U.S. Cl. 200—6 A **9 Claims**

1. A joystick comprising:

(a) a casing;

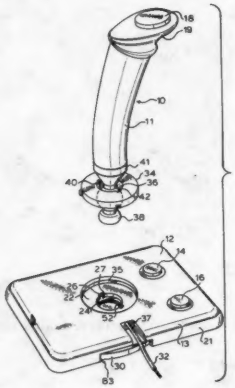
(b) a pair of gimbal plates mounted in said casing, each slidable orthogonally with respect to the other;

(c) a pair of transducers, a control member of each coupled to a corresponding gimbal plate such that a change in position of each gimbal plate produces a proportional change in movement of a corresponding one of said control members;

(d) a handle coupled to said casing having a gimbal actuating sphere engaging each of said gimbal plates, said handle universally pivotal throughout a portion of a spherical arc whose center lies intermediate said actuating sphere and an opposite end of said handle, such that movement of said handle results in corresponding movement of said gimbal

plates by an amount proportional to the component of displacement of said handle along the direction of movement of said corresponding gimbal plates;

(e) biasing means coupled to each of said gimbal plates urging each of said gimbal plates towards a neutral position, said biasing means including two pairs of opposed spring assemblies mounted on said casing, each pair urging an associated gimbal plate in opposite directions towards a neutral position;



(f) contact means coupled to said transducers for providing external electrical contacts thereto; and

(g) a spring tensioning wheel rotatably mounted in said casing, said wheel having sectorized progressive contoured cam means engaging each of said spring assemblies such that on rotation of said tensioning wheel, the biasing force applied to a corresponding gimbal plate is changed by an amount and in a direction depending on the amount and direction of rotation of said tensioning wheel.

4,590,340

STEERING WHEEL ASSEMBLY FOR VEHICLES

Yasuhisa Koike; Kazuhiro Kaneko; Kazuo Inaba, and Naoki Yamamoto, all of Fuji, Japan, assignors to Nihon Plast Co., Ltd., Fuji, Japan

Filed Jan. 29, 1985, Ser. No. 696,143

Int. Cl.[4] H01H *9/00*

U.S. Cl. 200—61.54 **10 Claims**

1. A steering wheel assembly for a vehicle comprising:

a steering wheel body defining therein at least one switch-receiving space; and

a horn switch assembly received in said space and secured to said steering wheel body;

said horn switch assembly including:

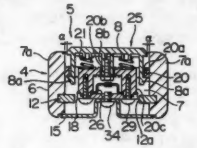
a base of an electrically insulating material disposed in said space and fixed to said steering wheel body, said base being formed therein with a through-hole;

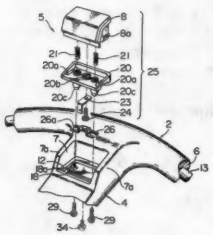
a horn switch button member of an electrically insulating material having a stem portion extending inwardly through said through-hole for movement relative to said base;

spring means resiliently biasing said horn switch button member away from said base;

a movable contact of a metal secured to the free end of said stem portion; and

a stationary contact means for making contact with said movable contact means, said stationary contact disposed in said space inwardly from said base and fixed to said





steering wheel body ad in alignment with, but normally spaced from, said movable contact.

4,590,341

COLUMN MOUNTED SWITCHING DEVICE

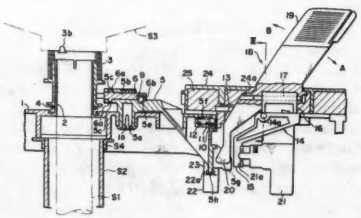
Masayosi Iwata, Hashima; Yoshikazu Hayashi, Kani, and Tadashi Yokoyama, Kuwana, all of Japan, assignors to Kabushiki Kaisha Tokai-rika-denki-seisakusho, Aichi, Japan

Filed Aug. 20, 1984, Ser. No. 642,425

Claims priority, application Japan, Aug. 22, 1983, 58-129984[U]; Aug. 22, 1983, 58-129988[U]

Int. Cl.[4] H01H *3/16*

U.S. Cl. 200—61.54 **17 Claims**



1. A switching device, mounted on a vehicle steering column, said steering column disposed about a steering shaft fixed at its upper end portion with a steering wheel rotationally operated by an occupant of the vehicle, which switching device comprises:

(a) a base plate mounted on the steering column;

(b) a revolution member supported to the base plate and rotatable in a first direction about a first revolution axis parallel substantially to an upper face of the base plate, the revolution member including a lever portion extending downward with respect to the disposition of the first revolution axis and a protrusion portion extending upward with respect to the disposition of the first revolution axis;

(c) an operation lever supported on the protrusion portion of the revolution member and rotatable about a second revolution axis parallel substantially to the upper face of the

base plate and, said second revolution axis being disposed substantially at a right angle to the first revolution axis, the operation lever including an occupant operated knob portion extending upward with respect to the disposition of the second axis, and a lever portion extending downward with respect to the disposition of the second axis, both the operation lever and the revolution member being rotatable about the first axis when the operation lever is rotated in a first predetermined direction and only the operation lever being rotated about the second axis when the operation lever is rotated in a second predetermined direction;

(d) first switch means disposed at a location remote from said first axis and operated in a direction parallel to the second revolution axis by the revolution of a distal portion of the revolution member lever portion in the first direction when the operation lever is revolved in said first direction; and

(e) second switch means operated by the revolution of the lever portion of the operation lever in the second direction when the knob portion is revolved in the said second predetermined direction, whereby the first switch means can securely be operated by the occupant.

4,590,342

PANEL MOUNTED SWITCHING DEVICE

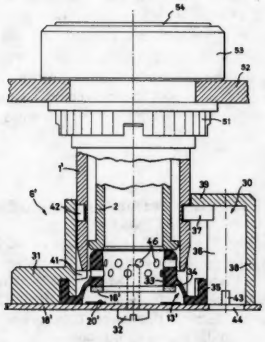
Eberhard Schlegel, Dürmentingen, Fed. Rep. of Germany, assignor to Firma Georg Schlegel, Dürmentingen, Fed. Rep. of Germany

Filed Nov. 7, 1983, Ser. No. 549,555

Claims priority, application Fed. Rep. of Germany, Nov. 8, 1982, 3241159; Sep. 29, 1983, 3335275

Int. Cl.⁴ H01H *13/52*

U.S. Cl. 200—159 B **12 Claims**



1. Switching device for installation in a switchboard or the like, comprising: an actuator composed of a housing arranged to extend through an opening in a supporting wall and to be secured in the supporting wall, said actuator further including a plunger mounted in said housing to be movable relative to said housing in a given direction between a rest position and a depressed position, and biassing means associated with said plunger for urging said plunger toward its rest position; a contactor mounted to be stationary relative to said actuator housing and arranged to be on the interior of the supporting wall, said contactor including a supporting member, means associated with said supporting member for supporting a plate arranged to be parallel to the supporting wall and carrying conductor paths, a rubber elastic ring membrane coaxial with said plunger and carrying a layer of a conductive elastomer facing the location of the conductor paths, said membrane being deformable for moving said conductive elastomer in the given direction against the conductor paths, and a cylindrical collar connected to said membrane and extending from said membrane toward said plunger, with the axis of said membrane being parallel to the given direction of movement of said plunger, said collar being axially compressible, said membrane being constructed to have a resistance to deformation, in said given direction, which is less than the resistance of said collar to axial compression, and said ring membrane and said collar being disposed between said plunger and the location of the conductor paths, and being arranged such that when said plunger is moved toward its depressed position, said plunger initially moves into contact with said collar, then displaces said collar and said membrane for causing said layer of conductive elastomer to contact the conductor paths before said plunger reaches its depressed position, and finally axially compresses said collar, whereby movement of said plunger into its rest position is effected by said biassing means.

2. Switching device as defined in claim **1** wherein said ring membrane encloses the socket of a display lamp.

4,590,343

KNIFE BLADE AND CLIP CONTACT ARRANGEMENT

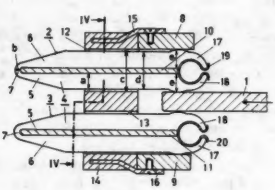
Riccardo Berta, Neuenhof, and Blaise Perrenoud, La Neuveville, both of Switzerland, assignors to BBC Brown, Boveri & Company, Limited, Baden, Switzerland

Filed Apr. 4, 1984, Ser. No. 596,837

Claims priority, application Switzerland, Apr. 28, 1983, 2277/83

Int. Cl.⁴ H01H *1/42, 1/54*

U.S. Cl. 200—282 **7 Claims**



1. A contact arrangement, comprising

a mounting member and two switch pieces movable relative to one another, one being a knife and the other being a gripper;

the gripper having two contact pieces which are located in said mounting member opposite one another, each of the contact pieces engaging the knife in a switch-on state;

each contact piece including a plurality of contact lamellae;

each contact lamella including first and second legs each having proximal and distal ends and connected to each other by a curved connection part at the distal ends of the legs to form a U-shaped contact lamellae;

a current terminal being mounted on said mounting member adjacent the proximal end of each of said second legs;

the proximal end of each of said first legs engaging the knife in the switch-on state; and

the second contact lamella legs engaging the current terminals in the switch-on state; and wherein

a plate is provided for supporting the contact lamellae that is interposed between and in contact with the first and second legs;

each leg further having a respective bent portion formed at its proximal end;

the respective bent portions of said first and second legs of each respective contact piece together defining a cavity; and

a shaped spring received in the cavity formed by the legs.

4,590,344

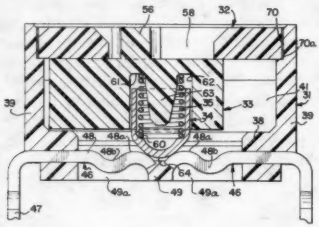
MACHINE INSERTABLE DIP SWITCH

Donald D. Kikta, Downers Grove, and Kent E. Regnier, Lombard, both of Ill., assignors to Grayhill, Inc., LaGrange, Ill.

Continuation-in-part of Ser. No. 458,341, Jan. 17, 1983, abandoned. This application Jun. 15, 1984, Ser. No. 621,216

Int. Cl.[4] H01H *1/06*

U.S. Cl. 200—291 **34 Claims**



1. A machine insertable slide DIP switch for a printed circuit board comprising,

a housing of electrical insulating material having top and bottom walls interconnected by opposed side and end walls,

a plurality of electrically conductive terminal means molded into said bottom wall, said terminal means including a plurality of juxtaposed pairs of terminal elements, each said element including a terminal arm disposed in fixed relation within the housing and in spaced end-to-end relation to the terminal arm of the other terminal element of the pair, said terminal arms being of equal length, each pair of terminal arms being undulated to define inclined curvate contact surfaces over which a contactor slides and to define a pair of contacts at their inner ends having opposed curvate surfaces and being centrally disposed, and a terminal leg extending substantially at right angles to each said arm and downwardly from the bottom wall such that the legs of a pair of terminal elements are in opposed and spaced apart relation,

and a plurality of slider-contactor units within the housing one for each pair of terminal elements, each unit having a slider, a contactor and a biasing means, each slider including a downwardly opening cavity of a depth substantially equal to the height of the slider, the lower surface of said slider being in closely spaced relation to said contacts, and an upwardly extending button actuator centrally disposed along said slider extending through an elongated opening in the top wall, each contactor being cup-shaped with the open end facing the cavity and the closed end engaging the contacts and sized to electrically connect the adjacent ends of the contacts when positioned therebetween, said contactor being slidably and matingly received by said cavity, and said biasing means being disposed within said contactor and biasing said contactor into engagement with said contacts and said slider into engagement with said top wall whereby the curvate surfaces of the undulated arms and the contacts thereon coact with the biased contactor to define a detenting action during movement of the slider-contactor units.

4,590,345

LIGHT SWITCH ADAPTER FOR TODDLERS

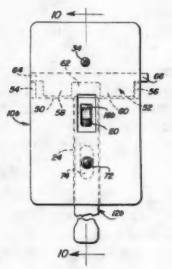
Edward L. Marshell, 5317 Meadow Wood Ave., Lakewood, Calif. 90712

Continuation-in-part of Ser. No. 584,917, Feb. 29, 1984, abandoned. This application Aug. 24, 1984, Ser. No. 643,796

Int. Cl.[4] H01H *3/20, 9/20*

U.S. Cl. 200—331 **16 Claims**

1. An adapter for a wall-mounted switch having a switch boss and a switch toggle projecting from the boss, the adapter enabling the switch to be operated by a toddler otherwise unable to reach the switch, the adapter comprising an adapter cover plate forming a replacement for an existing switch cover plate, the adapter cover plate having an elongate internal slot extending from a bottom edge of the adapter cover plate at least part way up the cover plate, an elongate operating rod having an upper portion slidingly received in the slot for guided lengthwise movement in the slot, aligned openings in a rear wall of the adapter plate, an upper end of the operating rod and a front wall of the adapter cover plate, the opening in the rear wall being adapted to fit around the switch boss with the toggle projecting through the openings in the operating



rod and the front wall of the cover plate, and a further opening formed through the adapter cover plate above the first and second openings to receive a screw for attaching the cover plate to a switch mounting plate through a screw hole in the mounting plate in a manner securing the rod on the switch with the lower part of the rod extending below the adapter cover plate to a level where it may be reached by a toddler, wherein the adapter cover plate includes a transverse slot intersecting said elongate slot and a stop slide selectively movable in the transverse slot between first and second positions respectively, blocking the operating rod for movement by a toddler to actuate the switch and freeing the operating rod for such movement.

4,590,346

METHOD OF HEATING PIPING ARRANGEMENT AND HEATING COIL

Isao Sugihara, and Tsukasa Ikegami, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

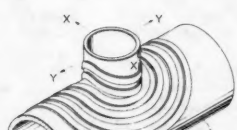
Filed Apr. 11, 1983, Ser. No. 483,536

Claims priority, application Japan, Apr. 30, 1982, 57-71144

The portion of the term of this patent subsequent to Mar. 19, 2002, has been disclaimed.

Int. Cl.[4] H05B *6/40*

U.S. Cl. 219—10.43 **13 Claims**



1. A method of uniformly heating a piping arrangement for preventing stress-corrosion cracking at a welded portion of the piping arrangement, comprising:

providing a pipe with coolant and heating an outer surface of said pipe by attaching an induction heating coil of

relatively large diameter including a stepped portion connecting adjacent turns of the coil, said adjacent turns respectively having turn ends bent in opposite directions and connected together to define the stepped portion and form a single coil from the turns so that current flowing in the coil is abruptly changed at the stepped portion to weaken the induction heating at the stepped portion relative to the remainder of the coil,

thereby generating a temperature difference between an inner surface and said outer surface of said pipe, and

simultaneously maintaining a spacing defined between said outer surface of said pipe and said heating coil that is smaller at said stepped portion than in the vicinity of said stepped portion to correspondingly maintain said heating and generating uniform.

4,590,347

INDUCED CURRENT HEATING PROBE

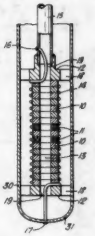
Gordon Thatcher, Lymm; Barry G. Ferguson, Warrington, and John P. Winstanley, Lymm, all of England, assignors to United Kingdom Atomic Energy Authority, London, England

Filed Nov. 4, 1983, Ser. No. 548,824

Claims priority, application United Kingdom, Nov. 12, 1982, 8232386

Int. Cl.⁴ H05B *6/38*

U.S. Cl. 219—10.49 R **5 Claims**



1. An induced current heating probe of the kind which can be entered into a tube to effect a braze at an external circumferential region of said tube, which probe has an electrically conductive external sheath closed at one end and which serves as both an electrical and cooling water conduit, has a flux-generating unit in the form of a stack of ferrite cores with a solid energising winding inside but spaced from the sheath and has a coaxial tube which also serves as both an electrical and cooling water conduit; the winding being electrically connected at one end with the coaxial tube and at the other end with the external sheath; the cores having openings defining a water flow passage through the stack; non-magnetic insulating rings between the cores in the stack; said coaxial tube communicating with the water flow passage, and the water flow passage communicating with the space between the sheath and the flux generating unit; the assembly of sheath, flux-generating unit and coaxial tube being arranged such that they accept series flow of both current and water with the flux-generating unit flooded with the water flow.

4,590,348

SYSTEM FOR HEATING MATERIALS WITH ELECTROMAGNETIC WAVES

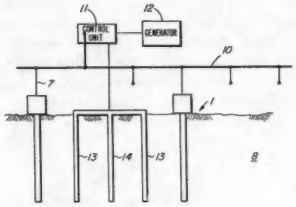
Howard R. Lahti, Mattawa, and Wallace R. Lahti, Pefferlaw, both of Canada, assignors to Canadian Patents and Development Limited, Ottawa, Canada

Filed Jul. 19, 1984, Ser. No. 632,515

Claims priority, application Canada, Jul. 20, 1983, 432797

Int. Cl.⁴ H05B *6/80*; E21C *37/16*

U.S. Cl. 219—10.55 M **11 Claims**



1. A process for preparing frozen material for excavation comprising the steps of:

(a) inserting longitudinally elongate electromagnetic energy applicators into said material at spaced locations, each said applicator being constructed for radiation of electromagnetic energy along a substantial portion of its length;

(b) sensing the temperature of said material a selected distance from at least one applicator;

(c) radiating electromagnetic energy through said applicators;

(d) ceasing to radiate electromagnetic energy through said applicators when said sensed temperature reaches a predetermined temperature, said predetermined temperature being at about the freezing point of said material, said selected distance being chosen so that portions of said material are heated to their freezing point and other portions of said material remain substantially unheated by said electromagnetic energy.

4,590,349

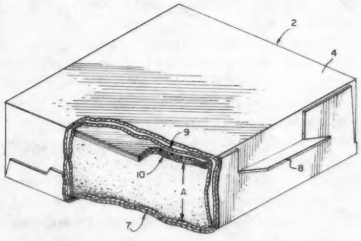
MICROWAVE COOKING CARTON FOR BROWNING AND CRISPING FOOD ON TWO SIDES

Richard K. Brown, Appleton, and Raymond V. Maroszek, Neenah, both of Wis., assignors to James River-Dixie/Northern, Inc., Norwalk, Conn.

Filed May 7, 1984, Ser. No. 607,587

Int. Cl.⁴ H05B *6/80*

U.S. Cl. 219—10.55 E **13 Claims**



1. A container for use in heating and crisping first and second sides of one or more pieces of food having non-uniform dimensions in a microwave oven, comprising:

(a) vertically spaced initial and final food supporting means separated by a vertical distance which normally exceeds

the vertical height of food pieces placed between said food supporting means,

(b) initial and final crisping means associated with said initial and final food supporting means, respectively, for converting microwave energy into heat capable of sequentially crisping the first and second sides of the food pieces being supported by said food supporting means during the heating and crisping process, and

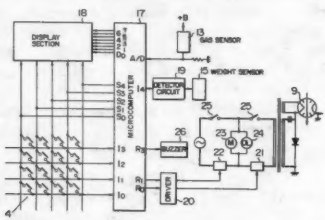
(c) turning means operatively connected with said pair of food supporting means for allowing manual inversion of said food supporting means after the first sides have been crisped to cause food pieces initially supported by said initial food supporting means to move under the force of gravity into supporting relationship with said final food supporting means with their second sides in cooking contact with said final crisping means.

4,590,350

AUTOMATIC HEATING APPARATUS EMPLOYING WEIGHT AND GAS SENSORS

Shigeki Ueda, Yamatokoriyama, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Dec. 17, 1984, Ser. No. 682,511
Claims priority, application Japan, Dec. 20, 1983, 58-240108
Int. Cl.[4] H05B *6/68*
U.S. Cl. 219—10.55 B **9 Claims**



1. An automatic heating apparatus comprising

a microwave power source for heating a load including food and a container in which said food has been placed;

control means connected to said microwave power source for controlling said heating means;

first sensor means connected to said control means for detecting at least one of gas and vapor emitted by said food as it is heated;

second sensor means connected to said control means for detecting the total weight of said food and container; and

key means connected to said control means for selectively providing instructions for heating said food, said key means including a single reheat input key to input instructions to said control means for initiating a reheating operation, whereby said control means

calculates a maximum period for heating said food, said maximum period being determined by the total weight of said food and container as detected by said second sensor means; and

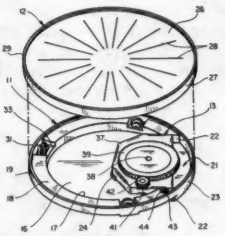
deenergizes said microwave power source upon the occurrence of the first of (1) said first sensor means detects at least one of gas and vapor being emitted by said food in an amount which exceeds a predetermined amount, and (2) said maximum period has elapsed.

4,590,351

COMPACT PORTABLE TURNTABLE FOR MICROWAVE OVENS

James F. Pomroy, St. Paul, and Allen M. Danley, Eagan, both of Minn., assignors to Plastics, Inc., St. Paul, Minn.

Filed Mar. 22, 1985, Ser. No. 715,110
Int. Cl.[4] H05B *6/78*
U.S. Cl. 219—10.55 F **6 Claims**



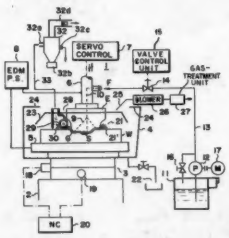
1. In a portable turntable for use in a microwave oven: a relatively shallow base which rests on a supporting surface in the oven cavity, a platform mounted on the base for rotation about a vertically extending axis, said platform having a ring of gear teeth centered about the axis and facing inwardly toward the axis, and a drive motor assembly removably mounted on the base beneath the platform with an output gear positioned within and in driving engagement with the ring of gear teeth for rotating the platform about the vertically extending axis.

4,590,352

DRY-CUT EDM WITH DEBRIS SWEEPING MEANS

Kiyoshi Inoue, Tokyo, Japan, assignor to Inoue-Japax Research Incorporated, Yokohama, Japan

Filed Nov. 8, 1983, Ser. No. 549,928
Claims priority, application Japan, Nov. 11, 1982, 57-198383
Int. Cl.[4] B23H *1/00, 7/38*
U.S. Cl. 219—69 M **14 Claims**



1. An EDM method of machining an electrically conductive workpiece, comprising the steps of:

spacedly juxtaposing a tool electrode with said workpiece to define a machining gap therebetween so as to be substantially open directly to a region of atmospheric air;

injecting a non-inflammable machining liquid into said machining gap and effecting electrical discharges therein to electroerosively remove stock from the workpiece and to permit said injected liquid to be at least partially decomposed with a resultant formation of machining products in the gap whereby the machining products grow in amount and are ejected out of the gap into said region and or a growing pile of debris on a surface of the workpiece adjacent to said machining gap; and

sweeping said growing pile of debris with brush means separate and distinct from said electrode in the form of a

brush with bristles to substantially remove said piled products from said surface.

4,590,353

ELECTRIC DISCHARGE MACHINING POWER SOURCE

Haruki Obara, Sagamihara; Shunzo Izumiya, Hachiouji; Yuji Okuyama, Tama, and Akihiro Sakurai, Hino, all of Japan, assignors to Fanuc Ltd, Yamanashi, Japan

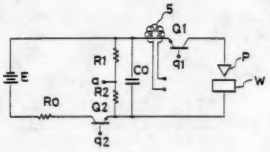
PCT No. PCT/JP84/00321, § 371 Date Feb. 8, 1985, § 102(e) Date Feb. 8, 1985, PCT Pub. No. WO85/00128, PCT Pub. Date Jan. 17, 1985

PCT Filed Jun. 19, 1984, Ser. No. 704,318

Claims priority, application Japan, Jun. 20, 1983, 58-109223

Int. Cl.⁴ B23P *1/08*

U.S. Cl. 219—69 C **5 Claims**



1. An electric discharge machining power source used for machining a workpiece by discharge of a capacitor, comprising:

discharge circuit means, with a first switching element, for discharging the capacitor;

charge circuit means, with a second switching element, for charging the capacitor;

charge voltage detecting means for detecting a charge voltage of the capacitor and generating a charge output when the charge voltage exceeds a reference voltage;

discharge current detecting means for detecting completion of discharge of the capacitor and generating a discharge output when a discharge current of the capacitor falls below a predetermined level selected to prevent damage of the first switching element even if the first switching element is turned off when the discharge current is at the predetermined level; and

switching control means, operatively connected to the charge voltage detecting means and the discharge current detecting means, for turning on the first switching element to initiate discharge of the capacitor, for turning off the second switching element to stop charge of the capacitor through the second switching element in response to the charge output, for turning off the first switching element to stop discharge of capacitor in response to the discharge output, and for turning the second switching element to start charging of the capacitor after an elapse of a predetermined time measured from completion of the discharge of the capacitor as indicated by the discharge output of the discharge current detecting means.

4,590,354

PLASMA WELDING OR CUTTING TORCH

Gérard Marhic, Cergy, and Eric Dufour, Franconville, both of France, assignors to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude, Paris, France

Filed Mar. 26, 1985, Ser. No. 716,191

Claims priority, application France, Apr. 4, 1984, 84 05286

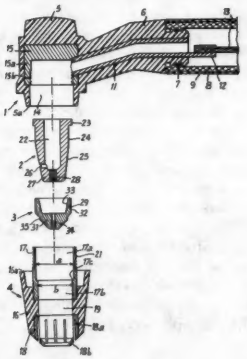
Int. Cl.⁴ B23K *9/00*

U.S. Cl. 219—121 PM **11 Claims**

1. A plasma-welding or cutting torch comprising:

(a) a torch body formed from insulating material and comprising a supply conductor extending through said body, said supply conductor comprising supply means for a plasma gas, said body further comprising a metal part for establishing electrical connection with said supply conductor;

(b) an annular skirt having a central annular casing of insulating material, first and second annular metal sleeves housed within said central annular casing of insulating material, and disposed in spaced axial relation thereto, said first metal sleeve being connectable to said hollow torch body; a nozzle designed to be inserted in said first metal sleeve and to abut against a front axial seat formed from said second metal sleeve; an axial electrode designed to be inserted into said first metal sleeve and to abut against a rear annular seat formed from said first metal sleeve; said annular skirt, first and second metal sleeves, axial elec-



trode, and nozzle forming an assembly so designed that said nozzle is freely slidable within said assembly, being delimited at one extreme by said second metal casing and at the other extreme by said axial electrode, said first metal sleeve comprising connecting means for connecting said assembly to said torch body and establishing electrical connection between said supply conductor, said metal part of said body, said first metal casing, and said electrode, whereby the freely-slidable nozzle is capable of coming into contact with the front extremity of said electrode in position on its seat, said nozzle being submitted at least during welding or cutting operation to an elastic force for applying the nozzle against its seat.

4,590,355

METHOD OF CONTROLLING MULTI-LAYER WELDING

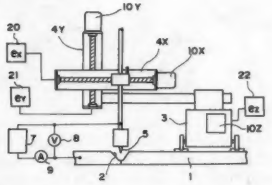
Hirokazu Nomura; Yuji Sugitani, and Naohiro Tamaoki, all of Tsu, Japan, assignors to Nippon Kokan Kabushiki Kaisha, Tokyo, Japan

Filed May 28, 1985, Ser. No. 738,291

Claims priority, application Japan, May 31, 1984, 59-109361

Int. Cl.⁴ B23K *9/12*

U.S. Cl. 219—125.12 **3 Claims**



1. In a method for effecting a multi-layer welding of a

groove of two pieces of metal by an arc welding process performed by weaving a welding electrode in a width direction (X axis) within the groove, said arc welding process performing a control operation such that a position of a forward end of the welding electrode is varied by driving means for moving the electrode in an axial direction (Y axis) thereof thus maintaining constant a predetermined welding current or arc voltage and thereby maintaining an arc length constant, a multi-layer welding control method comprising the steps of:

depositing a first layer by a one-pass layer welding by reversing the weaving of said electrode in said X-axis direction on condition that said electrode is raised by an amount equal to a predetermined value (e_0) when said electrode arrives at each of two slopes of said groove;

simultaneously detecting and storing successively a weaving width (Ww), a weaving center position (Wc) and a position (e_z) of said electrode in the direction of a line of a joint to be welded in each of all weaving cycles of said electrode made for said first layer from a starting end to a terminating end of said joint; and

comparing in magnitude a number N of said weaving widths included in a total number n of said stored weaving widths and exceeding a predetermined limiting weaving width (W_{MAX}) and a product αn of a predetermined ratio $\alpha(\alpha < 1)$ and said total number n when the welding of said first layer reaches said terminating end,

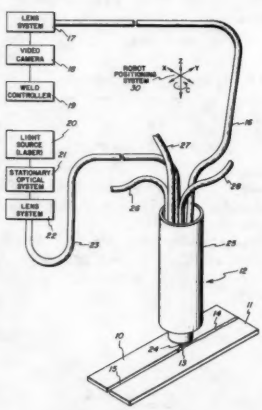
whereby if $N \leqq \alpha n$, it is determined that a second layer is also to be deposited by said one-pass layer welding thereby repeating the welding according to said control, whereas if $N > \alpha n$, it is determined that said second layer is to be deposited by a two-pass layer welding thereby depositing said second layer with two passes.

4,590,356

ROBOT NAVIGATION METHOD FOR JOINT FOLLOWING

Thomas P. Povlick, Clifton Park, and Allen W. Case, Jr., Amsterdam, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 12, 1985, Ser. No. 754,558
Int. Cl.[4] B23K 9/12
U.S. Cl. 219—124.34 **6 Claims**



4. A method of controlling the positioning system of an arc welding robot to move by increments and follow a joint between workpieces, said robot having a light projector and optical vision system, comprising the steps of:

(a) projecting two concentric arc-shaped light stripes onto said workpiece and joint ahead of the welding electrode and producing images that are relayed to a video camera and hence to a welding controller;

(b) capturing an image and executing a current move while computing a next move microvector from positioning system feedback data and from sets of navigation points extracted from said images which are at the intersections of each light stripe with the joint edges, each move microvector giving the incremental X and Y movement and angle change to approximately follow said joint, and initially determining whether the parallelism of two straight lines through the respective sets of navigation points is within predetermined limits;

(c) repeating step (b) with the modification that when the parallelism of said lines is outside said limits, the previously calculated move microvector is used until the parallelism is again within limits;

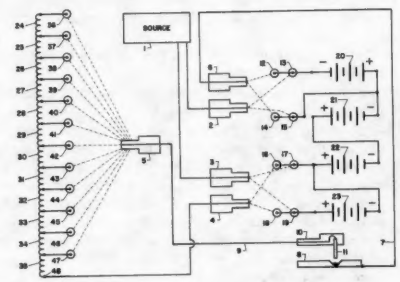
(d) immediately updating the angle change in the move microvector to the currently computed value and resuming step (b).

4,590,357

VEHICULAR ARC WELDER

Harry L. Winkler, Box 632, Pinehurst, Id. 83850

Filed Mar. 7, 1983, Ser. No. 472,288
Int. Cl.[4] B23K 9/10
U.S. Cl. 219—130.1 **4 Claims**



1. A vehicular arc welder comprising:

a battery pack comprised of four series connected individual batteries, the battery pack including a terminal connected at each pole of the jack and including two other terminals, each connected to an interconnection of individual batteries in the battery pack;

each of said terminals of the battery pack having two single conductor taper lock type jacks connected thereto, whereby two separate jack plugs may be selectively connected to each terminal;

a battery charger having two output cables each connected to a jack plug, these two jack plugs connected to two selected terminals of the battery pack, each plug being plugged into one of the two jacks at each terminal;

an inductive means comprised of twelve inductors connected in series, each interconnection of the inductors and the end of the first inductor which is not connected to another inductor being connected to a single conductor taper lock type jack, the end of the twelveth inductor which is not connected to another inductor being connected to a jack plug, this jack plug of the inductive means being plugged into one of the two jacks at a selected terminal of the battery pack,

two welding cables, one welding cable having a workpiece clamp connected at one end and having a jack plug at the other end, this jack plug being plugged into one of the two jacks at a selected terminal of the battery pack, the other welding cable having an electrode holder connected to one end and a jack plug at the other end, this jack plug

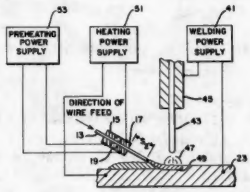
being plugged into a selected one of the jacks of the inductive means.

4,590,358

APPARATUS FOR ELECTRICALLY ISOLATED HOT WIRE SURFACING PROCESSES

Israel Stol, Pittsburgh, Pa., assignor to Unimation, Inc., Danbury, Conn.

Filed Oct. 4, 1984, Ser. No. 657,556
Int. Cl.[4] B23K 9/24
U.S. Cl. 219—136 10 Claims



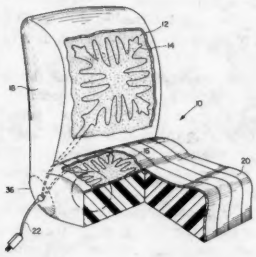
1. An apparatus for welding a metal workpiece comprising a first source of electric power operatively connected between a first electrode contact tip and a second electrode contact tip, a second source of electric power operatively connected between the second electrode contact tip and the workpiece, a consumable electrode slidably disposed between said electrode contact tips wherein the preheat content of the consumable electrode is controlled by adjusting current flowing through the consumable electrode and the first and second electrode contact tips, and a dielectric element disposed between the first and second electrode contact tips, the improvement wherein: the first electrode contact tip, the second electrode contact tip and the dielectric element each comprise a discrete member mounted in axial alignment and each discrete member has a bore therethrough through which the consumable electrode passes and wherein the bore in at least one of the electrode contact tips is axially displaced with respect to the axis defined by the axial alignment of the discrete members whereby the aforesaid axial displacement of the bore in at least one of the electrode contact tips maximizes the electric contact consistency between the consumable electrode and that particular electrode contact tip.

4,590,359

HEATING FOR A CAR SEAT

Ulrich Möbius, 45, Fraunhoferstrasse, D-6450 Hanau/Main, Fed. Rep. of Germany

Filed Apr. 26, 1984, Ser. No. 604,086
Int. Cl.[4] H05B 1/00
U.S. Cl. 219—217 10 Claims



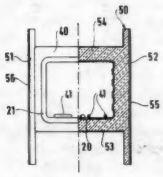
1. A heater for a car seat including a base and a back rest, said heater having at least one heating coil adapted to be connected to a source of power, said heater comprising a multi-ply fabric with at least an outer protective layer of union, a second layer, and a third layer with a low thermal transfer value; said heating coil being arranged in and laminated with said second layer, said heating coil being arranged in one plane in zigzag on a circle to obtain a star shaped-configuration, and said heater being a unit in form of a seat cover detachably encasing said base and said back rest.

4,590,360

COOKING CHAMBER APPARATUS

Paul Maitenaz, Olivet, and Alain Gernez, Orleans, both of France, assignors to Compagnie Europeenne pour l'Equipement Menager "Cepem", France

Filed Oct. 27, 1983, Ser. No. 546,226
Claims priority, application France, Oct. 29, 1982, 82 18163; Feb. 17, 1983, 83 02576
Int. Cl.[4] F27D 11/00
U.S. Cl. 219—390 11 Claims



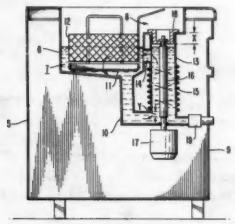
1. Apparatus comprising at least one cooking chamber, said chamber being delimited by a generally rectangular metal muffle having an open face and including top, bottom and laterally spaced side walls forming a muffle chamber, heater elements being operatively disposed relative to said muffle for heating said muffle interior, a frame supporting said muffle, and a thermally insulating material covering said walls of the muffle and interposed between said muffle and said frame, the improvement wherein said thermally insulating material comprises a unitary moulded thermal insulation body completely moulded about at least the opposed side walls and top and bottom walls of said muffle and moulded to said frame and functioning as the sole support for said muffle on said frame without any heat bridges therebeween, thereby limiting heat loss from the muffle chamber by conduction and improving the mechancal strength of said apparatus.

4,590,361

FOOD FRYING APPARATUS INCLUDING INDIRECT OIL HEATER

Claudio Del Fabbro, Porcia, Italy, assignor to Zanussi Grandi Impianti S.p.A., Pordenone, Italy

Filed May 29, 1985, Ser. No. 739,303
Claims priority, application Italy, Oct. 10, 1984, 34061/84[U]
Int. Cl.[4] F27D 11/00
U.S. Cl. 219—439 13 Claims



1. A food frying apparatus comprising:

a housing having a front side accessible to the exterior for cleaning and maintenance;

a vessel mounted within said housing and adapted to contain oil for the frying of food, said vessel having an expansion zone adjacent said front side for containing foam resulting from frying;

an oil heating container connected to said vessel, said container being positioned adjacent said front side and being in communication with said expansion zone;

electric heating means mounted on the exterior of said container for indirectly heating oil therein;

means for forcibly circulating oil between said vessel and said container, such that oil to be heated is passed from said vessel to said container and heated oil is passed from said container to said vessel, said circulating means comprising a motor mounted beneath said container, and a rotor coaxially mounted within said container and operatively coupled to said motor to be rotated thereby within said container; and

means for removably mounting said rotor within said container and coupling said rotor to said motor in a manner to ensure that said rotor is uncoupled from said motor prior to disconnection of said rotor from said container, said mounting means comprising a plug axially slidably insertable into and removable from the top of said container between closed and open positions thereof, said rotor having an upper end connected to said plug in a manner to enable relative rotation therebetween and to prevent relative axial movement therebetween, said rotor having a lower end connected to said motor in a manner to enable relative axial movement of said rotor with respect to said motor between engaged and disengaged positions and to prevent relative rotary movement therebetween in said engaged position, and the axial length of said engagement position between said motor and said lower end of said rotor being less than the axial length of movement of said plug between said closed and open positions of said container.

4,590,362

DRIVE CIRCUIT FOR TEMPERATURE CONTROL HEATER IN INK JET PRINTER

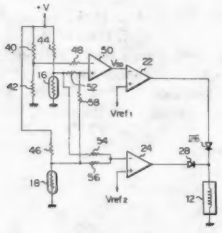
Kazumi Ishima, Kashiwa, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan

Filed Apr. 18, 1984, Ser. No. 601,463

Claims priority, application Japan, Apr. 20, 1983, 58-69539; Apr. 20, 1983, 58-69538

Int. Cl.⁴ H05B *1/02*

U.S. Cl. 219—497 **13 Claims**



1. A heater drive circuit for controllably driving a heater to maintain a temperature of an object at an optimum level, comprising:

an atmospheric temperature sensor for sensing an atmospheric temperature;

a heater temperature sensor for sensing a temperature of the heater;

an amplifier having a first input supplied with an output of said atmospheric temperature sensor and a second input supplied with a predetermined and variable first reference voltage, said amplifier supplying the heater with power necessary for a startup of the heater, said amplifier having an amplification ratio larger than "1";

a comparator having a first input supplied with an amplified output of said amplifier and a second input supplied with an output of the heater temperature sensor; and

an error amplifier having a first input supplied with an output of the heater temperature sensor and a second input supplied with a predetermined and variable second reference voltage, said error amplifier supplying the heater with power necessary for a stationary operation of the heater to maintain the object at the optimum temperature;

outputs of said comparator and said error amplifier being connected to the heater for supplying said startup power and said stationary operating power respectively thereto.

4,590,363

CIRCUIT FOR CONTROLLING TEMPERATURE OF ELECTRIC SOLDERING TOOL

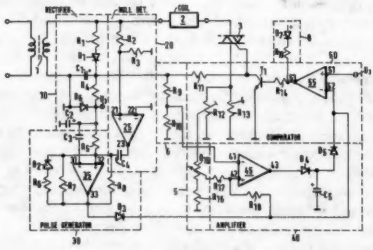
Jürgen Bernard, Schollbrunn, Fed. Rep. of Germany, assignor to ERSA Ernst Sachs KG GmbH & Co., Fed. Rep. of Germany

Filed May 23, 1983, Ser. No. 497,200

Claims priority, application Fed. Rep. of Germany, Jul. 28, 1982, 3228202

Int. Cl.⁴ H05B *1/02*

U.S. Cl. 219—497 **5 Claims**



1. A circuit arrangement for controlling the operating temperature of a heating element in an electrical soldering tool, comprising:

a heating circuit including a soldering tool heating element, a precision resistor for monitoring a current flowing through the heating element and a triac switching element connected between the precision resistor and the heating element, the triac having a control gate for opening and closing the triac to respectively block or pass current to the heating element and a switch-on threshold;

a comparator connected to the control gate of the triac for switching the triac open as a function of the voltage drop across the precision resistor;

a null detector connected to the heating circuit for detecting the passage of a null in AC voltage supplied to the heating circuit;

a pulse generator connected to the null detector and the comparator for generating pulses to operate the comparator to switch the triac element closed according to the pulses for measuring the switch-on threshold for the triac element when the comparator has switched the triac element open as a function of the voltage drop across the precision resistor; and

a control amplifier circuit connected to the precision resistor for receiving the voltage drop across the precision resistor and for receiving a preset voltage, said control amplifier comparing said voltage drop across said precision resistor with said preset voltage, said control amplifier connected to one input of said control comparator, an integration capacitor in said control amplifier and means for applying

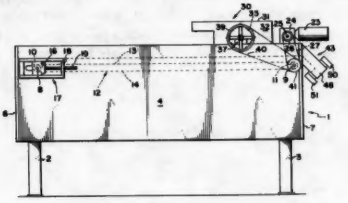
a reference voltage to another input of said comparator, said control amplifier circuit charging said integration capacitor when the voltage drop across the precision resistor at least reaches the preset voltage, the integration capacitor being charged to a charge voltage and connected to the comparator for operating the comparator with the charged voltage which is compared to the reference voltage in such a way that the triac element is switched closed as long as the charged voltage is higher than the reference voltage and is switched open as long as the charge voltage is lower than the reference voltage, the integration capacitor thus forming a time function element for reheating the heating element after the triac element has been switched open.

4,590,364

CONTAINER COUNTING APPARATUS

Theodore R. McDonald, and Randall H. Hetzner, both of Saginaw, Mich., assignors to Fischer-Flack, Inc., Saginaw, Mich.

Filed Jul. 7, 1983, Ser. No. 511,409
Int. Cl.⁴ B61L *1/16*
U.S. Cl. 235—98 C **18 Claims**



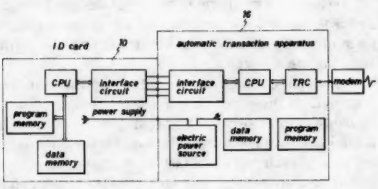
1. Apparatus for counting containers comprising movable conveyor means for supporting and moving containers in a direction leading toward a discharge zone; spaced partitions of less height than that of said containers overlying said conveyor means and defining a plurality of parallel rows unobstructed at their upper ends and each of which has a width corresponding substantially to that of said containers; metering means overlying said partitions upstream from said discharge zone, said metering means having a sweep surface spanning all of said rows and spaced above said conveyor means a distance greater than the height of any of said containers but less than twice the height of any of said containers, thereby precluding the delivery of stacked containers to said discharge zone; and counting means downstream from said metering means for each of said rows for counting each container passing said zone in each of said rows.

4,590,365

AUTOMATIC TRANSACTION SYSTEM

Toshihiko Okada, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan

Filed Jul. 31, 1984, Ser. No. 636,164
Claims priority, application Japan, Aug. 1, 1983, 58-139504
Int. Cl.⁴ G06F *15/30*
U.S. Cl. 235—379 **2 Claims**



1. An automatic transaction system for performing transactions with an automatic transaction apparatus when an ID card is inserted within said automatic transaction apparatus, comprising:

an integrated circuit built into the ID card, said integrated circuit having means for storing at least one program used for processing data by at least one of editing, ciphering, operating on and checking said data necessary to determine whether or not a transaction should be made;

a center apparatus connected to the automatic transaction apparatus, said center apparatus containing transaction data for different customers;

means in said integrated circuit for carrying out a predetermined program processing of the data corresponding to the ID card;

means in said center apparatus for judging whether or not a transaction should be made as a result of the predetermined program processing; and

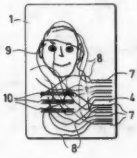
means for transmitting the result of the judgment to the automatic transaction apparatus to control operation of said automatic transaction apparatus.

4,590,366

METHOD OF SECURING SIMPLE CODES

Rolf E. Rothfjell, Kalix, Sweden, assignor to Esselte Security Systems AB, Stockholm, Sweden

Filed Jun. 28, 1984, Ser. No. 625,467
Claims priority, application Sweden, Jul. 1, 1983, 8303800
Int. Cl.⁴ G06K *19/06*
U.S. Cl. 235—494 **6 Claims**



1. In a verification defice comprising an object on which a machine-readable arrangement of a plurality of visible characters define a security code incorporated thereon, the improvement comprising a portion of said object separate from said characters having a plurality of visible indicia elements defining a pattern, said elements being visually related in configuration to said respective characters to enable detection of an alteration in one or more of said characters by visual inspection of resulting alteration in said relative configuration of said elements and said characters, without requiring machine-reading of said pattern.

4,590,367

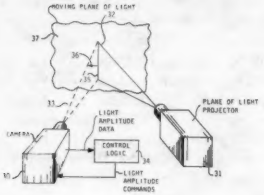
ARRANGEMENT FOR THE EXPANSION OF THE DYNAMIC RANGE OF OPTICAL DEVICES

Joseph Ross, Fort Salonga, and Richard Schmidt, Huntington, both of N.Y., assignors to Robotic Vision Systems, Inc., New York, N.Y.

Filed Oct. 6, 1983, Ser. No. 539,727
Int. Cl.⁴ G01J *1/32*
U.S. Cl. 250—205 **10 Claims**

1. A method for reducing the dynamic range of light energy incident within an imaged optical scene, comprising the steps of: determining relative light energy levels in predetermined locations within said imaged scene; generating a control signal for each of said predetermined locations indicative of said energy levels; modifying said light energy levels by reducing said light energy at said predetermined locations where said light energy exceeds a predetermined high level and increasing

said light energy at said predetermined locations where said light energy is below a predetermined low level; and repeating



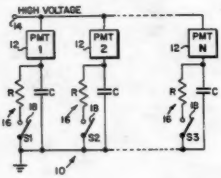
said steps until said light energy levels lie within said high and low levels.

4,590,368

DIGITAL GAIN ADJUSTER CIRCUIT FOR PHOTOMULTIPLIER TUBES

Johan A. Govaert, Peabody, Mass., assignor to Baird Corporation, Bedford, Mass.

Filed Feb. 22, 1983, Ser. No. 468,579
Int. Cl.[4] H01J *40/14*
U.S. Cl. 250—207 **10 Claims**



1. A voltage gain adjuster circuit for photomultiplier tubes (PMT's) comprising:

(a) a source voltage;

(b) a plurality of PMT's arranged in a circuitry, each of said plurality of PMT's coupled to said voltage source to apply a voltage thereacross and having a specific internal resistance;

(c) a plurality of switch means and a plurality of resistances, together forming a plurality of effective resistances coupled in series with said plurality of PMT's; and

(d) digital means coupled to said plurality of switch means for adjusting said plurality of effective resistances for each of said plurality of PMT's, adjusting thereby the voltage across each of said plurality of PMT's.

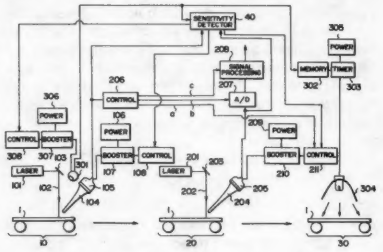
4,590,369

METHOD OF DETECTING SENSITIVITIES OF PHOTOMULTIPLIERS

Kazuo Horikawa, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Oct. 13, 1983, Ser. No. 541,634
Claims priority, application Japan, Oct. 13, 1982, 57-179249
Int. Cl.[4] G05B *1/02*
U.S. Cl. 250—252.1 **7 Claims**

1. A method of detecting and adjusting the sensitivities of a plurality of photomultipliers relative to one another in a radiation image recording and reproducing system employing a stimulable phosphor sheet carrying a radiation image stored therein, wherein the photomultipliers are arranged sequentially in a preliminary and a secondary stage, comprising the steps of; sequentially irradiating said photomultipliers to light emitted from the same light source, comparing the outputs of said photomultipliers generated under said irradiation, said stimulable phosphor sheet carrying a radiation image stored therein exposed to stimulating rays which cause the stimulable phosphor sheet to emit light in proportion to the radiation energy stored therein, reading out the emitted light photoelectrically and converted it to an electric signal, reproducing the radiation image into a visible image based on the obtained



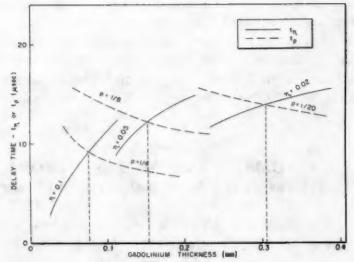
electric signal; and wherein the plurality of said photomultipliers comprises a photomultipliers used for preliminary read-out for detecting in advance the image input information stored in said stimulable phosphor sheet, and a photomultiplier used for final read-out for obtaining said visible for viewing purposes.

4,590,370

EPITHERMAL NEUTRON DIE-AWAY LOGGING

William R. Mills, Jr., Duncanville, and Linus S. Allen, Dallas, both of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 487,541, Apr. 22, 1983, abandoned. This application Jul. 19, 1984, Ser. No. 632,354
Int. Cl.[4] G01V *5/10*
U.S. Cl. 250—267 **16 Claims**



1. A system for epithermal neutron die-away logging of subterranean formations surrounding a borehole comprising:

(a) a source of fast neutrons, for irradiating the formations surrounding a borehole,

(b) a neutron counter for counting epithermal neutrons returning to the borehole from said irradiated formations,

(c) a neutron filter surrounding said neutron counter having a thickness so as to permit the longest possible delay time following each burst of fast neutrons from said source before said epithermal neutrons from the irradiated formations are detected by said neutron counter while at the same time optimizing the epithermal neutron counting rates by minimizing thermal neutron effects.

4,590,371

INLET SYSTEM FOR A MASS SPECTROMETER

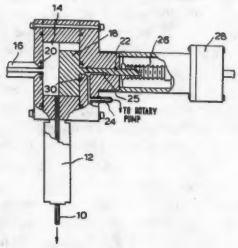
Thomas W. Ottley, Royston, United Kingdom, assignor to Prutec Limited, United Kingdom

Filed Jun. 8, 1984, Ser. No. 618,467

Claims priority, application United Kingdom, Jun. 10, 1983, 8315956

Int. Cl.[4] H01J *49/04, 49/24*

U.S. Cl. 250—289 3 Claims



1. An inlet system for use in a pyrolysis mass spectrometer which comprises a capillary tube for the introduction of pyrolysate for analysis into the ion source of the spectrometer, an expansion chamber arranged at the end of said capillary tube, a sample chamber for containing a sample to be analysed, said sample chamber including an aperture enabling said sample chamber to communicate with said expansion chamber, a piston slidably disposed within said expansion chamber and having one axial end for opening and closing said aperture, and a pumping line for evacuating said expansion chamber to low vacuum after communication is established between said expansion chamber and said sample chamber, said piston additionally sealing off said pumping line from said expansion chamber after a low vacuum has been achieved in said latter chamber to permit evacuation of said expansion chamber to a higher vacuum by way of said capillary tube.

4,590,372

MEASURING ARRANGEMENT FOR DETERMINING THE GASEOUS RADIOIODINE CONCENTRATION IN A CARRIER GAS

Jürgen Wilhelm, Gondelsheim, and Heinrich Mahnau, Hamburg, both of Fed. Rep. of Germany, assignors to Kernforschungszentrum Karlsruhe GmbH, Karlsruhe, Fed. Rep. of Germany

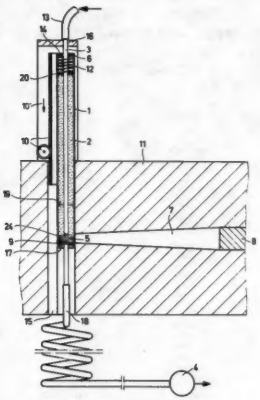
Filed Mar. 5, 1984, Ser. No. 586,129

Claims priority, application Fed. Rep. of Germany, Mar. 3, 1983, 3307439

Int. Cl.[4] G01T *7/04*

U.S. Cl. 250—304 10 Claims

1. Measuring arrangement for determining the concentration of gaseous radioiodine in a carrier gas, comprising: means including a mass of sorption agent for separating gaseous radioiodine from the carrier gas and for accumulating the separated radioiodine, with a part of the mass of sorption agent being located in a measuring region; means defining a conduit for conducting the carrier gas to said sorption agent and having an outlet portion surrounded by said sorption agent and provided with at least one outlet via which carrier gas can flow into the measuring region containing sorption agent; and a radiation detector disposed for detecting radiation emanating from the measuring region; wherein said means including a sorption agent are movable relative to said means defining a conduit for



bringing different portions of the mass of sorption material into the measuring region.

4,590,373

DEVICE FOR MEASUREMENT OF CONTENT OF LOOSE MIXTURES COMPONENTS

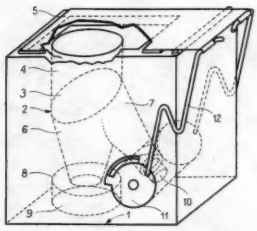
Piotr Barton, Tychy; Pawel Krzystolik, Pszczyna; Jan Sliz; Roman Dworok, both of Tychy; Kazimierz Lebecki, and Ryszard Slotwinski, both of Mikolów, all of Poland, assignors to Glowny Instytut Gornictwa, Katowice, Poland

Filed Mar. 21, 1984, Ser. No. 591,682

Claims priority, application Poland, Apr. 1, 1983, 241369

Int. Cl.[4] G01N *23/00*

U.S. Cl. 250—308 8 Claims



1. A device for measurement of the content of loose mixtures components, comprising a beta radiation source, a detector recording radiation backscattering from said radiation source at a mixture sample, a casing integral with a tribranched hollow chamber mounted therein, the chamber being divided at a branching point by a beta radiation-permeable membrane, to form a top branch which defines a container for a loose material sample to be examined, and two bottom branches, one of which leads to an inlet for said radiation detector, and the other of which leads to said radiation source, and a movable lid connected to means for selectively closing the container defined by said top branch.

4,590,374

INFRA-RED LIGHT ABSORPTION GAS DETECTOR

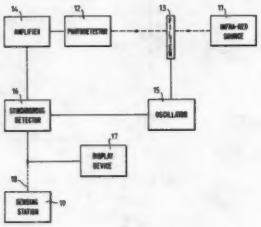
Arthur E. Brewster, Thaxted, United Kingdom, assignor to International Standard Electric Corporation, New York, N.Y.

Filed Sep. 28, 1984, Ser. No. 656,044

Claims priority, application United Kingdom, Oct. 22, 1983, 8328291

Int. Cl.[4] G01N *21/27*; G02B *5/28*

U.S. Cl. 250—338 **5 Claims**



1. An arrangement for detecting and measuring the concentration of a gas having an infra-red absorption band, the arrangement including a light source and photodetector, a multilayer interference filter disposed in the light path between the source and detector and supported on a single crystal silicon substrate, and means for vibrating the filter such that its transmission peak oscillates across the absorption band edge of the gas to be detected.

4,590,375

APPARATUS FOR DETECTION OF AN ENEMY'S INFRARED CAMERA

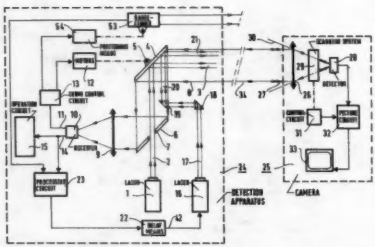
Philippe Rovati, Bretigny sur Orge; Claude Jourdain, Morsang sur Orge, and Olivier de Witte, Gif sur Yvette, all of France, assignors to Compagnie Industrielle des Lasers Cilas Alcatel, Marcoussis, France

Filed May 29, 1984, Ser. No. 614,906

Claims priority, application France, May 31, 1983, 83 08968

Int. Cl.[4] G02F *1/29*; G01J *5/10*; G01S *17/74*

U.S. Cl. 250—348 **7 Claims**



1. An apparatus for the detection of an enemy infrared camera, said camera including a periodical line scanning system of the infrared energy situated in a particular sector, a convergent optical system for concentrating the infrared energy scanned by the scanning system, an electro-optical infrared detector positioned to received the energy concentrated by the optical system and a visualising system connected to the scanning system and to the electrical output of the detector for forming a thermal image of the section on a screen, said apparatus including: an infrared beam laser generator for generating an infrared beam; an orientable reflector positioned for directing the infrared beam to said camera and for reflecting infrared signals sent back to said reflector by said camera optical system; an infrared electro-optical receiver means for receiving the infrared signals reflected by said reflector, said receiver means including first and second electrical outputs and supplying, in its first output, reception electrical signals representing the intensity of the received infrared signals and supplying, on its second output, vertical reference electrical signals representing the discrepancy between a reference point on the sensitive surface of said receiver means and the reception points of the infrared signals on said surface; a servo-control system means connected to the second electrical output of said receiver means for receiving the vertical reference electrical signals, said servo-control system means controlling the positioning of the reflector in order to reduce said discrepancy; an electro-optical range-finder means for periodically providing an output indicating of the distance of said camera; positioning means coupled to said servo-control system means for positioning said range-finder means with respect to said camera; a first spot being created on the camera screen each time the scanning system directs to said detector the infrared laser energy which has been concentrated by the optical system, said optical system sending back to said apparatus, by a catadioptric effect, an infrared signal made of part of this concentrated energy, the receiver means supplying in return a reception electrical signal on its first electrical output, said apparatus further comprising:

pulse means responsive to a control electrical signal for emitting a laser pulse towards said reflector in parallel with an emitting axis of said laser generator for reflection by said reflector toward said camera to appear on the camera screen as a very bright second spot;

a processing circuit means, responsive to said range-finder means output and to said first electrical output of said receiver means, for measuring the time intervals between reception electrical signals, determining the line rate and the picture rate of said camera scanning system in accordance with said measured time intervals, said processing circuit means includig means for determining, in accordance with said range-finder means output and in accordance with the line and picture rates, a delay time greater than a minimum value representing a minimum acceptable displacement between said first spot and said second spot on said camera screen such that said second spot will represent a picture of a dummy object displaced by a predetermined minimum distance from said apparatus, and a maximum value representing the maximum desirable displacement between said second spot and said first spot such that said second spot will cause a dazzling effect on said camera screen to render said first spot no longer visible; and

delay means coupled to said processing circuit means for supplying, at said picture rate, said control electrical signal delayed by said delay time with respect to said reception signal.

4,590,376

APPARATUS AND TECHNIQUE FOR MONITORING PHOTOELECTRON EMISSION FROM SURFACES

Tennyson Smith, Thousand Oaks, Calif., assignor to Photo Acoustic Technology, Inc., Newbury Park, Calif.

Filed May 30, 1984, Ser. No. 577,271

Int. Cl.[4] G01F *23/00*

U.S. Cl. 250—358.1 **13 Claims**

1. An apparatus for performing quality assurance inspections of a surface comprising:

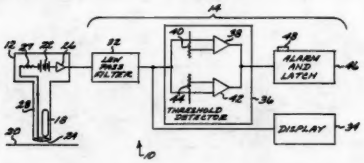
an ultraviolet light source disposed to direct ultraviolet light against the surface;

means for collecting photoelectrons emitted from the surface under the action of the ultraviolet light, said collection means including a collector to collect the current of emitted photoelectrons and biasing means to positively bias said collector with respect to the surface;

amplifier means for producing an amplified voltage signal proportional to the current of emitted photoelectrons, said ultraviolet light source, collection means and amplifier

means together acting as a sensing unit to produce said amplified voltage signal;

a low-pass filter to filter out the high-frequency component of the amplified voltage signal, to produce a filtered voltage signal;



detector means for detecting when the filtered voltage signal falls outside preselected limits; and

means for signalling a variation of the filtered voltage signal outside the preselected limits, whereby an unacceptable surface is indicated.

4,590,377

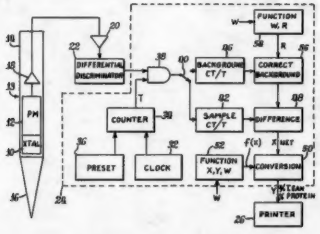
IN SITU ISOTOPIC MEAT GRADER

H. Richard Lukens, La Jolla, Calif., assignor to IRT Corporation, San Diego, Calif.

Filed Jun. 11, 1984, Ser. No. 619,056

Int. Cl.[4] G01T *1/167, 1/202*

U.S. Cl. 250—361 R **16 Claims**



1. A meat grader for grading a meat sample disposed in a bin of predetermined dimensions wherein said meat sample extends at least about two feet in all directions, said meat grader comprising:

at least one probe including a housing containing a scintillation phosphor responsive to gamma rays including 1.46 Mev gamma rays from potassium-40 for producing corresponding light pulses of magnitude systematically related to the energy of the incident gamma rays, and photomultiplier means optically coupled to said phosphor and responsive to said light pulses for producing corresponding electronic pulses of magnitude systematically related to the magnitude of said light pulses, said probe being adapted to penetrate said meat sample in said bin to dispose said phosphor near the center of said meat sample at least about a foot from the margin thereof,

differential pulse height discrimination means coupled to the output of said photomultiplier means for selectively responding to such of said electronic pulses as are of a limited range of magnitude including that characteristic of such pulses occasioned by the incidence of said 1.46 Mev gamma rays upon the respective said phosphor by producing corresponding' discriminated signal pulses,

counting rate means responsive to said discriminated signal pulses for counting the number of said discriminated signal pulses in a predetermined time interval to provide a gross counting rate signal corresponding to gross counting rate,

background counting rate means for providing a background counting rate signal corresponding to the number of discriminated signal pulses in said predetermined period of time occurring with said at least one probe in an environment corresponding to the meat sample in the absence of potassium-40,

and differential means responsive to said background counting rate signal and said gross counting rate signal for producing a net counting rate signal corresponding to the difference between said gross counting rate and said background counting rate is a net counting rate corresponding to 1.46 Mev gamma rays from potassium-40.

4,590,378

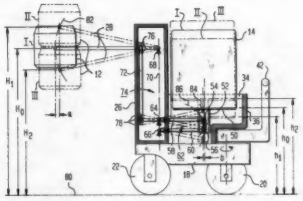
COUNTERBALANCED RADIATION DETECTION DEVICE

Winfried Platz, Southington, Conn., assignor to Siemens Gammasonics, Inc., Des Plaines, Ill.

Filed Jun. 4, 1984, Ser. No. 616,998

Int. Cl.[4] G01T *1/164*

U.S. Cl. 250—363 S **12 Claims**



1. A counterbalanced radiation detection device comprising:

(a) a base;

(b) a radiation detector having a known weight;

(c) means connected with the radiation detector and the base for positioning the radiation detector in different heights with respect to the base;

(d) electronic component means movably mounted on the base for counterbalancing the weight of the radiation detector;

(e) means connected with the electronic component means and the radiation detector positioning means for positioning the electronic component means in different heights with respect to the base opposite to the heights of the radiation detector;

(f) means connected with the radiation detector and the base for shifting the radiation detector horizontally with respect to the base; and

(g) means connected with the electronic component means and the radiation detector shifting means for shifting the electronic component means horizontally with respect to the base in opposite direction to shifting of the radiation detector.

4,590,379

ACHROMATIC DEFLECTOR AND QUADRUPOLE LENS

Frederick W. Martin, Colebrook Rd., North Stratford, N.H. 03590

Continuation of Ser. No. 187,789, Sep. 16, 1980, abandoned. This application Sep. 16, 1982, Ser. No. 418,794

Int. Cl.[4] H01J *29/58, 29/70*

U.S. Cl. 250—396 R **5 Claims**

1. The method of achromatic deflection of particles which comprises:

forming a substantially uniform electric field between electrodes radially spaced on either side of a common longitudinal axis and a substantially coincident, substantially uniform magnetic field perpendicular to said electric field;

adjusting the strengths of said fields so that the magnetic

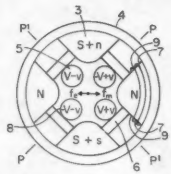
force on a particle travelling parallel to said axis is twice the electric force on said particle in magnitude and opposite in direction; and

deflection of the direction of travel of particles emergent from said fields from said axis by an angle dependent on the magnitude of said field strengths so adjusted, whereby said angle does not depend on the velocity of the particle.

4. Means for simultaneous achromatic focusing and achromatic deflection of a beam of particles comprising:

an improved achromatic quadrupole lens comprising four parallel conducting wire electrodes, equally spaced from a common axis and arranged at an angular interval of 90 degrees around said axis, a lead-in wire at each end of each electrode, and currents flowing in a direction substantially parallel to said axis within each electrode and in opposite direction to the current in adjacent electrodes, said currents being such as to create a magnetic quadrupole force field;

wherein the improvement comprises adjustable power supply means which create voltage differences of substantial, equal magnitude between adjacent electrodes and of polarity such that electrodes on opposite sides of said common axis have the same voltage with respect to ground,



said voltage differences being such as to create an electric quadrupole force field; and wherein the adjustable supply means maintain the ratio of the magnitudes of the electric and magnetic quadrupoles fields such that the focal lengths of the improved lens are independent of particle velocity;

and an achromatic deflection means, which comprises adjustable power supply means connected to said wire electrodes and energizing a magnetic deflection force field within said lens, said force field being substantially perpendicular to the axis of said lens, and adjustable power supply means connected to said wire electrodes and energizing an electric deflecting force field within said lens, said electric force field being collinear with said magnetic force field at points along said axis;

and means for adjusting the relative magnitude of said fields so that the magnetic deflection force on a particle travelling along said axis is twice the electric deflecting force on said particle in magnitude and opposite in direction;

in which case said achromatic deflecting means affects the angle at which particles emerge from the lens by an amount dependent on the magnitude of said field strengths so adjusted and independent of particle velocity.

4,590,380

MEANS FOR LOCATING AN ULTRA-PRECISION POSITIONING OF A TABLE

Akira Tamaki, Maebashi, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Japan

Filed Dec. 14, 1984, Ser. No. 682,055
Claims priority, application Japan, Jan. 18, 1984, 59-4184
Int. Cl.[4] G21K *5/10*
U.S. Cl. 250—442.1 **1 Claim**

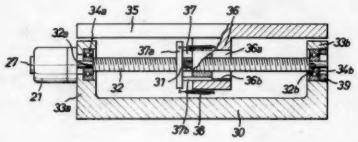
1. Means for locating an ultra-precision positioning of a table, comprising:

a case body;

a movable table disposed upon a top of said case body;

a screw shaft means rotatable by a motor and supported by bearing means, said screw shaft means being disposed in parallel with a moving direction of said table;

a nut means engaged with said screw shaft means and supported by said table for axially roughly moving said table upon rotation of said screws shaft means by way of spring means disposed between said nut means and said table; and



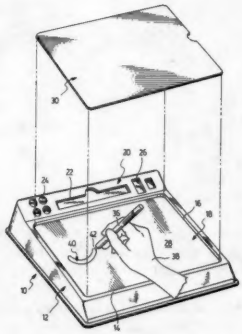
a piezoelectric element disposed between said nut means which is said table, said piezoelectric element being pressed by said spring means and extensible minutely in an axial direction of said table, to input fine movement to said table through said nut means enabling an ultra-precision positioning of said table.

4,590,381

PHOSPHORESCENT MARKING SYSTEM

Max Mendelson, Toronto, Canada, assignor to Pineapple Industries, Inc., Canada

Filed Jun. 13, 1985, Ser. No. 744,269
Int. Cl.[4] H05B *33/00, 33/10;* **G01J** *1/58;* **G01N** *21/64*
U.S. Cl. 250—484.1 **16 Claims**

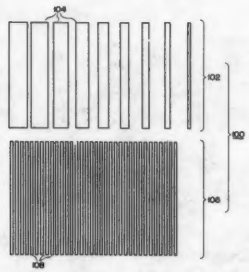


1. In a device of phosphorescent material on which luminescent images are formed and retained for a period of time, said device comprising means for supporting said phosphorescent material, said phosphorescent material including a uniform distribution of a phosphor in a carrier, said support means permanently shielding a bottom surface of said phosphorescent material from phosphor activating light, said support means exposing a top surface of said phosphorescent material to phosphor activating light, the improvement comprising means for shielding said phosphorescent material top surface from phosphor activating light, said shield means being positionable over said top surface to maintain said phosphorescent material in a deactivated state and subsequently removable from said top surface to expose said top surface to phosphor activating light, a source of light and means for controlling exposure of selected portions of said phosphorescent material to said source of light to form an image on said inactivated phosphorescent material when said shield is removed, said image being retained for said period of time until activation of said phosphor has decayed to an inactivated state of an imperceptible level of luminescence.

4,590,382
METHOD OF ALIGNING TWO MEMBERS UTILIZING MARKS PROVIDED THEREON

Mitsuo Tabata, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed May 24, 1984, Ser. No. 613,732
Claims priority, application Japan, May 31, 1983, 58-96148
Int. Cl.[4] G01N *21/00, 23/00*
U.S. Cl. 250—491.1 6 Claims



1. A method of aligning first and second members utilizing first and second marks respectively provided on the first and second members, comprising the steps of:

irradiating the first member with an energy beam so as to allow the first mark to emit an electron beam;

reciprocally deflecting the electron beam to scan the second mark;

detecting a second different energy beam emitted from the second mark upon irradiation of the second member with the electron beam;

synchronously detecting a detection signal of the second energy beam so as to obtain a phase sensitive detection signal; and

obtaining a relative positional deviation between the first and second members in accordance with at least one of the detection signals and the phase sensitive detection signals and aligning the first and second members in accordance with the deviation, the first mark having a first alignment pattern consisting of lines, which emit the electron beam upon irradiation with the energy beam, and spaces between said lines, the second mark having a second alignment pattern consisting of lines which emit the second different energy beam upon irradiation with the electron beam, and spaces between the lines of said second alignment pattern, the second energy beam emitted from the lines being stronger than that emitted from the spaces, the lines of the first and second alignment patterns becoming larger in width from one end to the other end of each alignment pattern, and an overlapping area between the lines at the first and second alignment patterns changing approximately in accordance with a quadratic curve or a curve given by an equation of higher degree, which represents the positional deviation between the first and second members.

4,590,383
SPENT FUEL STORAGE CASK HAVING IMPROVED FINS

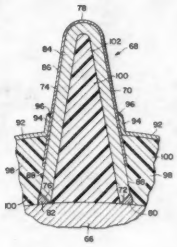
Octavio J. Machado, and Larry E. Efferding, both of Pensacola, Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Oct. 22, 1984, Ser. No. 663,530
Int. Cl.[4] G21F *5/00*
U.S. Cl. 250—506.1 11 Claims

1. A cask for storing spent nuclear fuel, comprising:

a cask base element;

a plurality of elongated fins, each fin including a metal element having a pair of sides which are joined at a curved apex region and which have edges spaced apart from the apex region, and a protective metal layer bonded to the metal element at the apex region and at least a portion of each side;



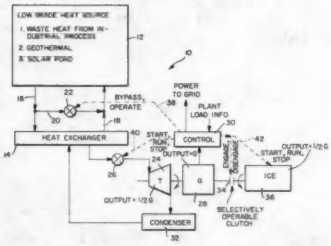
means for affixing the edges of the metal elements to the periphery of said cask base element; and

means disposed between the sides of each fin for absorbing neutrons.

4,590,384
METHOD AND MEANS FOR PEAKING OR PEAK POWER SHAVING

Lucien Y. Bronicki, Rehovot, Israel, assignor to Ormat Turbines, Ltd., Yavne, Israel

Filed Mar. 25, 1983, Ser. No. 479,008
Int. Cl.[4] F01B *23/10*
U.S. Cl. 290—4 C 12 Claims



1. In a power plant that furnishes low grade heat to an organic fluid Rankine cycle turbine that drives a generator, the improvement comprising the steps of oversizing the generating capacity of the generator relative to the individual capacities of the turbine and the prime mover, and selectively starting and coupling a fast starting prime mover to the generator in response to sensing a load on the generator in excess of a predetermined threshold.

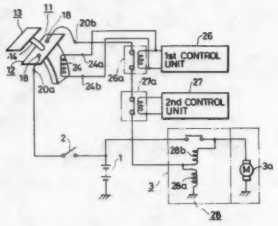
4,590,385
AUTOMATIC STARTER

Isao Hamano; Akira Morishita; Yoshifumi Akae; Toshinori Tanaka; Kouichi Matsumoto; Takeo Gotou, and Kiyoshi Yabunaka, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Nov. 15, 1983, Ser. No. 552,194
Claims priority, application Japan, Nov. 15, 1982, 57-173657[U]
Int. Cl.[4] F02N *11/08*
U.S. Cl. 290—38 E 5 Claims

1. An automatic starter for a vehicle equipped with an auto-

matic transmission, in which the improvement comprises an accelerator pedal comprising: a first accelerator pedal member; a second accelerator pedal member attached to said first accelerator pedal member through a returning elastic member in a manner so as to be movable back and forth in a depressing direction of said accelerator pedal; attracting and holding



means for attracting and holding said second accelerator pedal member to retain said second accelerator pedal member integrally with said first accelerator pedal member, whereby said accelerator pedal is extendible and contractible in two stages; and means for energizing said attracting and holding means during rotation of an engine of said vehicle to attract and hold said second accelerator pedal member.

4,590,386

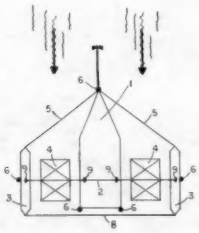
PIGGY BACK WATER POWER GENERATOR

B. Ryland Wiggs, 3630 Villanova Ct., Bethlehem, Pa. 18017

Filed Sep. 21, 1984, Ser. No. 652,841

Int. Cl.[4] F03B *7/00*

U.S. Cl. 290—54 **4 Claims**



1. A power generating system including a central, watertight, floating boat containing gearing and an electric generator; two watertight, floating outrigger pontoons smaller in size than the central boat; two paddle wheels with one respective paddle wheel on each side of the central boat, with each respective paddle wheel having four flat blades spaced 90° apart, each blade having a solid surface area from the central connecting axle to the extremities of each blade, with each respective paddle wheel's four blades being offset 45° from the other paddle wheel's four blades, with the spacing between the paddle wheels being a minimum of one-half the width of the blades; with each respective wheel's central axle being situation high enough above the water surface to capture all of the incoming water's head build up, in conjunction with the sides of each respective paddle wheel being enclosed from the central axle to a point at or near the outside extreme end of each respective paddle wheel; and with a shaft connecting both paddle wheels to the generator via gearing.

4,590,387

TRANSFER SWITCH

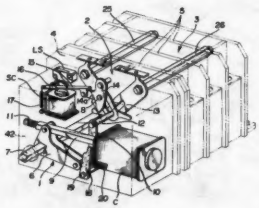
Katsuhiro Yoshida, Gifu, and Hiroshi Horiguchi, Aichi, both of Japan, assignors to Aichi Electric Works Co., Ltd., Nagoya, Japan

Filed Dec. 11, 1984, Ser. No. 680,491

Claims priority, application Japan, Sep. 17, 1984, 59-194317

Int. Cl.[4] H02J *9/00*

U.S. Cl. 307—64 **5 Claims**



1. A transfer switching apparatus comprising:

an operating lever, a control circuit for moving the operating lever from a rest position to a switching position, a spring for returning the operating lever to the rest position;

a control shaft movable up and down along two inclined paths of a substantially V-shaped guide groove with the rotation of the operating lever and positioned in the middle of the guide groove when the operating lever is in the rest position;

movable contactors operatively connected with the control shaft, connecting respectively first and second current source side fixed contactors with a load side fixed contactor when the control shaft is at the upper ends of the two inclined paths and located in neutral positions when the control shaft is in a middle position of the guide groove;

a point plate having a tip positioned inside the guide groove, manually or electrically rockable so as to alternatively close the two inclined paths for the control shaft in the guide groove and normally energized by a spring force so as to close one of the inclined paths of the guide groove and

a latch energized to be normally in sliding contact with the operating lever engaged with the operating lever near the rotation end of the operating lever, preventing the return of said operating lever and capable of disengaging the operating lever.

4,590,388

CMOS SPARE DECODER CIRCUIT

Donald G. Clemons, Northampton, and Michael V. DePaolis, Jr., Center Valley, both of Pa., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Apr. 23, 1984, Ser. No. 602,680

Int. Cl.[4] H03K *19/096, 19/20, 19/003;* **G11C** *7/00*

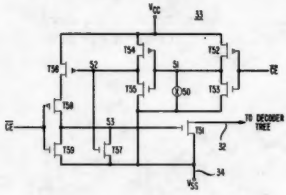
U.S. Cl. 307—202.1 **10 Claims**

1. An integrated circuit comprising an array of field effect transistors capable of being programmed by fusing fusible means so that said array as programmed responds to a unique one of 2^n logic states,

CHARACTERIZED IN THAT

said array comprises a series string of n pairs of field effect transistors having a channel of a first conductivity type, wherein said fusible means are capable of changing each of said transistors between an operative and a nonoperative condition, wherein said string is adapted to carry a decoder current that flows through the channels of the operative transistors therein; and further charactered by additional fusible means for preventing the flow of said

current until said additional fusible means is fused; and still further characterized by enabling means to allow said



decoder current to flow only when an enabling signal is in a given voltage state.

4,590,389

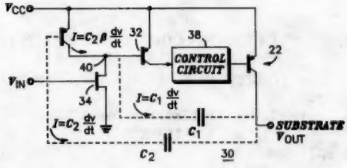
COMPENSATION CIRCUIT AND METHOD FOR STABILIZATION OF A CIRCUIT NODE BY MULTIPLICATION OF DISPLACEMENT CURRENT

David L. Cave, and Byron G. Bynum, both of Tempe, Ariz., assignors to Motorola Inc., Schaumburg, Ill.

Filed Apr. 2, 1984, Ser. No. 596,191

Int. Cl.[4] H03K *3/26;* **G06G** *7/10, 7/12*

U.S. Cl. 307—303 **16 Claims**



1. In an integrated circuit comprising a supply voltage line, a substrate of a first impurity type, an epitaxial region of a second impurity type and a circuit node in said epitaxial region, wherein the output is intended to be taken from said substrate and having parasitic capacitance between said substrate and said epitaxial region, the improvement comprising a compensation circuit which comprises

a switching device having first, second and control terminals thereof, said first terminal being coupled to said supply voltage line, said control terminal being coupled to said substrate by said parasitic capacitance and said second terminal thereof being connected to said circuit node,

said switching device for supplying a current to said circuit node being sufficient to prevent unwanted oscillations.

4,590,390

SOLID STATE PHOTONIC DETECTOR WITH CHARGE TRANSFER READER AND IMAGE-FORMING TARGET USING SUCH A DETECTOR

Marc Arques, Paris, France, assignor to Thomson-CSF, Paris, France

Filed Jun. 24, 1982, Ser. No. 391,485

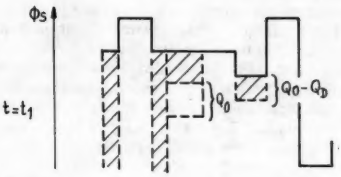
Claims priority, application France, Jun. 30, 1981, 81 12841

The portion of the term of this patent subsequent to Nov. 19, 2002, has been disclaimed.

Int. Cl.[4] H01L *29/78;* **H03K** *3/42*

U.S. Cl. 307—311 **4 Claims**

1. A solid state photon detector with a charge transfer readout device, a signal from the detector being injected in the form of charges into the readout device through a first MOS transistor, said MOS transistor having a source connected to the detector, a control gate and an electrode forming a drain; transfer charges created in the readout device being of the opposite sign to those of the signal; comprising means for generating a current formed of charges having the same sign as the transfer charges, and means for injecting this current into said transistor, wherein the means for generating a current being formed on the same substrate as the readout device and comprising a second MOS transistor conveniently biased and located side by side with the first MOS transistor, wherein the second MOS transistor is formed by a first P doped zone in the substrate to which the detector is connected and which consti-



tutes the source of the first transistor, a second P doped zone formed in this substrate and a first gate disposed between two said zones, and means for biasing, during operation, said second transistor alternately under linear and disabled operating conditions, and a second gate on the substrate, and means for applying, during operation, to said second gate a ramp voltage at least once during a time interval which separates two successive transfers of the signal, from a transition of signal to the readout device.

4,590,391

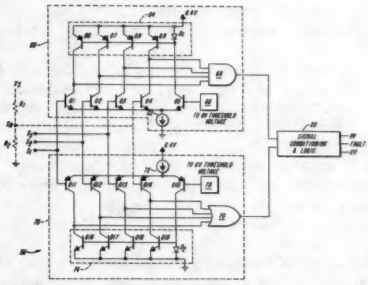
MULTI-INPUT ZERO OFFSET COMPARATOR

Richard L. Valley, Nashua, N.H., assignor to Unitrode Corporation, Lexington, Mass.

Filed Dec. 19, 1983, Ser. No. 562,720

Int. Cl.[4] H03K *5/24;* **G01R** *19/165*

U.S. Cl. 307—355 **7 Claims**



1. A comparator to sense the voltage level of a plurality of input signals relative to a first reference signal, having a first circuit comprising:

a current mirror circuit providing a plurality of equal current signals in response to control signal;

a current source controlling a current flow;

a plurality of sensing transistors each having a base, an emitter, and a collector, wherein

the base of each said sensing transistor receiving an input signal to be sensed;

the emitter of all said sensing transistors being connected to said current source; and

the collector of each said sensing transistors receiving an equal current signal from said current mirror circuit and producing an output signal;

a differential transistor having a base, an emitter, and a collector, wherein

the collector of said differential transistor is connected to provide said current mirror control signal;

the base of said differential transistor is connected to said first reference signal; and

the emitter of said differential transistor is connected to the emitters of said plurality of said sensing transistors and to said current source; and

means to combine the output signal of said plurality of sensing transistors to produce a comparator first circuit output signal according to the relationship of each said input signal to said first reference signal, wherein

said current flow controlled by said current source is directed from said differential transistor to at least one said input transistor when the respective input signal exceeds said first reference signal to produce a corresponding output signal on the respective collector output.

4,590,392

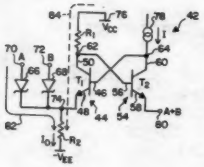
CURRENT FEEDBACK SCHOTTKY LOGIC

Tho T. Vu, Fridley, Minn., assignor to Honeywell Inc., Minneapolis, Minn.

Filed Sep. 19, 1983, Ser. No. 533,715

Int. Cl.[4] H03K *19/084, 19/01, 19/12, 3/286*

U.S. Cl. 307—446 **5 Claims**



1. An electrical circuit, comprising:

a first bipolar transistor having a first emitter, first base and first collector;

a second bipolar transistor having a second emitter, second base and second collector, wherein said second collector is directly electrically connected to said first base and said first collector is directly electrically connected to said second base;

a first current source connected to said first emitter;

a load means connected to and between said first collector and a voltage reference point;

a second current source connected to said second collector; and

a unidirectional current conducting means directly electrically connected to said first emitter, wherein electrical signals can be input to said unidirectional current conducting means and an output taken at said second emitter.

4,590,393

HIGH DENSITY GALLIUM ARSENIDE SOURCE DRIVEN LOGIC CIRCUIT

Stephen A. Ransom, Huntingdon Valley, and Tedd K. Stickel, Chalfont, both of Pa., assignors to Sperry Corporation, Blue Bell, Pa.

Filed Jun. 13, 1983, Ser. No. 503,944

Int. Cl.[4] H03K *19/21, 19/094*

U.S. Cl. 307—471 **7 Claims**

1. A high density GaAs source driven logic circuit comprising:

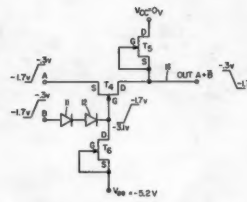
input switch transistor means having source, drain and gate electrodes,

at least one non-inverting input line coupled to said source electrode,

at least one inverting input line coupled to said gate electrode,

an output line coupled to said drain electrode,

current source pull-down transistor means coupled to said output line, and



current source pull-down transistor means coupled to said gate electrode of said input switch transistor means, whereby said at least one inverting input signal on one of said inverting input lines is logically combined by said input switch transistor means with a non-inverting input signal on said non-inverting input line to provide a logic function output on said output line.

4,590,394

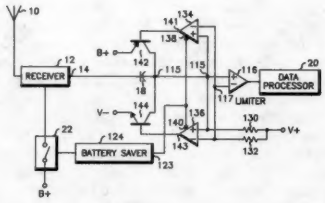
SIGNAL PROCESSING CIRCUIT WITH VOLTAGE CLAMPED INPUT

Gary L. Pace, Ft. Lauderdale, Fla., assignor to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 13, 1984, Ser. No. 589,269

Int. Cl.[4] H03K *5/08*

U.S. Cl. 307—549 **15 Claims**



1. A signal processing arrangement having an input and a reference voltage, said signal processing arrangement for use with a signal, said signal being capacitively coupled to said input, said signal processing arrangement comprising in combination:

first voltage comparing means for comparing an input signal at said input with said reference voltage and for providing a first output signal when said input signal exceeds said reference voltage by a first predetermined voltage;

first voltage clamping means, coupled to said input, for preventing said input signal from exceeding said reference voltage by more than said first predetermined voltage;

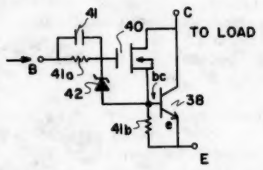
second voltage comparing means for comparing said input signal with said reference voltage and provding a second output signal when said input signal decreases below said reference voltage by a second predetermined voltage; and

second voltage clamping means, coupled to said input, for preventing said input voltage from decreasing below said reference voltage by more than said second predetermined voltage.

4,590,395
FET-BIPOLAR DRIVE CIRCUIT

Donald F. O'Connor, Ramsey, Minn., and Zoltan Zansky, Willowdale, Canada, assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jul. 20, 1984, Ser. No. 632,578
Int. Cl.[4] H03K *17/60, 19/08, 3/33*
U.S. Cl. 307—570 2 Claims

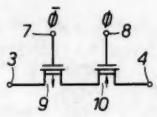


1. A proportional base bipolar switch drive circuit comprising:
a source of modulated control voltage;
a bipolar switching transistor;
a single FET having a gate connected to the modulated control voltage through a parallel R-C circuit, a source connected to the base of the bipolar transistor and a drain connected to the collector of the bipolar transistor;
a Zener diode connected in parallel with the FET gate and source terminals and between the parallel R-C circuit and the base of the bipolar transistor;
resistance means connected between the Zener diode and ground and across the base-emitter junction of said bipolar transistor.

4,590,396
INTEGRATED MOSFET TRANSFER GATE

Hideharu Koike, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jul. 25, 1983, Ser. No. 516,887
Claims priority, application Japan, Jul. 26, 1982, 57-129796
Int. Cl.[4] H03K *17/693*
U.S. Cl. 307—572 3 Claims

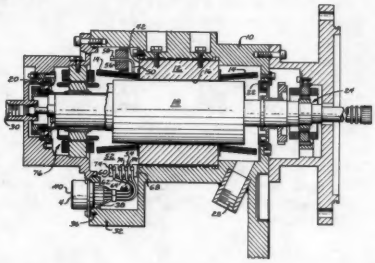


1. An integrated circuit comprising:
an output terminal and an input terminal receiving an input signal;
a first depletion type MOSFET having a source to drain current path connected to said input terminal and provided with a first gate control input;
a second depletion type MOSFET having a source to drain current path connected in series with said first MOSFET source to drain current path and to said output terminal, said second depletion type MOSFET being of a different conduction type from said first depletion type MOSFET and provided with a second gate control input; and
control means for supplying first and second phase-inverted control signals to said first and second gate control inputs whereby only a predetermined state of said control signals renders said MOSFETs conducting and couples said input signal to said output terminal.

4,590,397
TERMINAL BLOCK FOR DYNAMOELECTRIC MACHINE

Randall D. Davis, Rockford, Ill., assignor to Sundstrand Corporation, Rockford, Ill.

Filed Nov. 30, 1984, Ser. No. 677,031
Int. Cl.[4] H02K *11/00*
U.S. Cl. 310—71 8 Claims

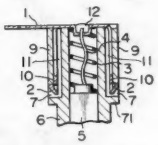


1. In a multiple phase generator for generating a plurality of phases, the combination of
a stator including a body of magnetizable material and a plurality of groups of windings associated therewith, each group defining one of said phases, each winding being of solid wire;
a rotor mounted for rotation relative to said stator;
a housing containing said rotor and said stator
a plurality of multi-terminal connectors mounted on said housing and accessible from the exterior thereof;
a terminal block within said housing and mounting a plurality of electrically isolated bus bars, one for each said phase;
means connecting each of said bus bars to a corresponding one of said groups; and
a plurality of stranded wire conductors interconnecting each of said bus bars and each of said multi-terminal connectors.

4,590,398
BRUSH HOLDER

Toshio Nagamatsu, Iruma, Japan, assignor to Kabushiki Kaisha Yaskawa Denki Seisakusho, Fukuoka, Japan

Filed Oct. 3, 1984, Ser. No. 657,400
Claims priority, application Japan, Feb. 3, 1984, 59-13212[U]
Int. Cl.[4] H02K *13/00*
U.S. Cl. 310—239 5 Claims



1. A brush holder comprising:
a brush box including a brush sliding tube, said brush sliding tube being mounted at opposite upper sides thereof with a pair of side plates, each of said side plates forming a clearance and having an upper opening and a lower opening; and
a brush terminal bent to form a generally U-shaped section having an upper opening and having a pair of bent pieces at opposite ends and a central portion therebetween for

connecting a pigtail, at least one of said pair of bent pieces being provided with an engaging projection, said projection opening to the outside of said brush sliding tube, and one of said pair of bent pieces being partially cut and extended to form an electrical contact, said brush teminal is fixed to said brush box such that said pair of bent pieces are inserted into said clearances at the opposite sides of said brush sliding tube, and that said engaging projection of said bent pieces is engaged with said lower opening of each of said side plates.

4,590,399

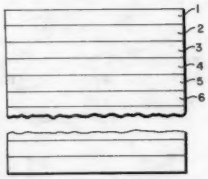
SUPERLATTICE PIEZOELECTRIC DEVICES

Charles B. Roxlo, Bridgewater, and Peter D. Persans, Flemington, both of N.J., assignors to Exxon Research and Engineering Co., Florham Park, N.J.

Continuation-in-part of Ser. No. 584,486, Feb. 28, 1984, abandoned. This application Oct. 9, 1984, Ser. No. 659,172

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—334 **11 Claims**



1. A piezoelectric device whose active material which exhibits the piezoelectric effect comprises a superlattice which includes a multilayered material wherein layers **1, 3, 5** . . . have the same compressibility and layers **2, 4, 6** . . . have the same compressibility but different from that of layers **1, 3, 5** . . . and wherein electric fields exist across each layer, said electric fields being perpendicular to the interface between layers with the sign of the electric field alternating between adjacent layers.

4,590,400

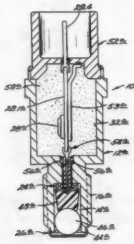
PIEZOELECTRIC CYLINDER PRESSURE TRANSMITTER

Vishwa Shukla, North Attleboro; Francois A. Padovani, Westwood, and Lawrence Cooper, Attleboro, all of Mass., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Oct. 26, 1984, Ser. No. 665,237

Int. Cl.[4] H01L *41/08*

U.S. Cl. 310—338 **8 Claims**



1. A device for providing an electrical signal corresponding to pressure in a cylinder of an internal combustion engine during normal running operating of the engine comprising

piezoelectric means for providing an electrical signal in response to the application of pressure,

means for mounting the piezoelectric means to be responsive to pressure in a cylinder of the engine, the mounting means including a metal body having a chamber opening at one end of the body accommodating the piezoelectric means therein, means for securing said one body end in a well communicating with the cylinder, and diaphragm means secured over the chamber opening at said one body end to be movable in response to variations in fluid pressure in the engine cylinder to transfer forces to the piezoelectric means to provide an electrical signal corresponding to said cylinder pressure variations while shielding the piezoelectric means from an environment within the cylinder,

electronic means carried on the mounting means to amplify said initial electrical signal for transmission to a location remote from the piezoelectric means

conductor means having first contact means thereon extending from the piezoelectric means to locate the first contact means in a selected position on the mounting means,

housing means receiving the electronic means thereon holding the electronic means in a selected position on the housing means,

second contact means on the electronic means,

locating and guide means provided on the housing means and on the mounting means cooperating to position the housing means on the mounting means with said first and second contact means engaged to electrically interconnect the piezoelectric means, and

means detachably attaching the housing means to the mounting means to reliably retain the contact means in such engagement when subjected to engine vibrations characterized in that

the mounting means has a second chamber accommodating the electronic means therein and forming a support section in the mounting means between the chambers, said support section having a passage therein extending between the chambers, the conductor extends through the passage and has a stiff end portion extending into the second chamber forming said first contact means, and

the second contact means comprises a U-shaped spring clip having a pair of spring leaf legs having one leg secured to said electronic means, and having said extending conductor end received between said spring leaf legs to be resiliently engaged by said legs for electrically connecting the piezoelectric means to the electronic means.

4,590,401

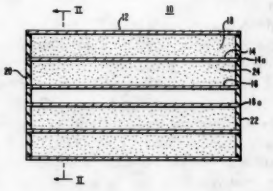
ION CHAMBER WITH A FLAT SENSITIVITY RESPONSE CHARACTERISTIC

Norman P. Goldstein, Murrysville, Pa.; Alex D. Service, Erin, and William H. Todt, Elmira Heights, both of N.Y., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Feb. 25, 1983, Ser. No. 469,869

Int. Cl.[4] H01J *47/02, 47/08*

U.S. Cl. 313—93 **4 Claims**



1. An ion chamber which exhibits a flat response to a wide range of incident gamma energy levels, which ion chamber comprises a hermetically sealed chamber within which at least a pair of spaced apart electrodes are disposed, which elec-

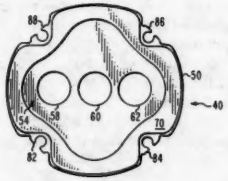
trodes have hermetically sealed electrical lead-ins through the chamber wall to permit electrical connection to a predetermined operating potential source and to current measuring means, which current is a function of the incident gamma radiation field, and wherein selected gamma radiation interactive fill gas fills the hermetically sealed chamber at a selected high pressure which provides a high sensitivity, and wherein the selected fill gas is a mixture of a first major constituent, low atomic number gas, which first major constituent is nitrogen and is present in at least 85 volume percent of the fill gas mixture and exhibits a reduced gamma response at low gamma energy levels, and a second minor constituent, high atomic number gas, which second minor constituent is xenon and is present in up to about 15 volume percent of the fill gas mixture and exhibits an increased gamma response at low gamma energy levels.

4,590,402

COLOR PICTURE TUBE HAVING AN IMPROVED EXPANDED FOCUS LENS TYPE INLINE ELECTRON GUN

Roger C. Alig, West Windsor Township, Mercer County, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Aug. 31, 1984, Ser. No. 646,095
Int. Cl.[4] H01J *29/50, 29/62*
U.S. Cl. 313—414 **3 Claims**



1. In a color picture tube having an inline electron gun for generating and directing three electron beams, a center beam and two side beams along coplanar paths toward a screen of said tube, said gun including a main focusing lens for focusing said electron beams, the main focusing lens being formed by two spaced electrodes each having three separate inline apertures therein, each electrode also including a peripheral rim, the peripheral rims of the two electrodes facing each other, and the apertured portion of each electrode being within a recess set back from the rim, the improvement comprising

the recesses of said electrodes having substantially the same dimension perpendicular to the inline direction of the inline apertures as the dimension parallel to the inline direction of the inline apertures and having lesser dimensions along diagonals angled at approximately 45 degrees with respect to the inline direction of the inline apertures.

4,590,403

COLOR PICTURE TUBE HAVING AN IMPROVED INLINE ELECTRON GUN

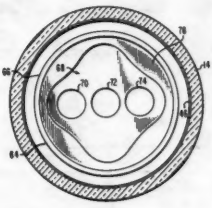
Roger C. Alig, West Windsor Township, Mercer County, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Aug. 31, 1984, Ser. No. 646,117
Int. Cl.[4] H01J *29/50, 29/62*
U.S. Cl. 313—414 **3 Claims**

1. In a color picture tube including a neck, a funnel and a faceplate and having an inline electron gun in said neck for generating and directing three inline electron beams, a center beam and two side beams, along coplanar paths toward a screen of said tube, said gun including two spaced electrodes which form a main focus lens for focusing said electron beams, the improvement comprising

one of said electrodes being an internal conductive coating on said neck, and

the other of said electrodes including a cylindrical portion smaller in diameter than said neck and located in overlapped relation with respect to said conductive internal coating, an apertured portion containing three inline aperatures which are aligned with the electron beam paths, and means located between said cylindrical and apertured portions for controlling the astigmatism of the focus of the two side beams.

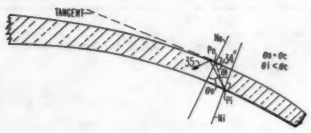


4,590,404

CATHODE-RAY TUBE HAVING A FACEPLATE WITH DECREASING CENTER-TO-EDGE THICKNESS

Ralph J. D'Amato, Lancaster, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed Mar. 30, 1984, Ser. No. 595,522
Int. Cl.[4] H01J *29/86*
U.S. Cl. 313—477 R **3 Claims**



1. In a cathode-ray tube including an envelope comprising a faceplate panel, a funnel and a neck, said faceplate panel including a transparent rectangular faceplate having a cathodoluminescent screen on an interior surface thereof, and said faceplate having a minor axis and a major axis, the improvement comprising

the thickness of said faceplate increasing from center-to-edge along said minor axis and along cross-sections parallel to said minor axis, and decreasing from center-to-edge along said major axis.

4,590,405

BIVALENT EUROPIUM-ACTIVATED BARIUM ALUMINATE PHOSPHOR AND LOW MERCURY VAPOR DISCHARGE LAMP PROVIDED WITH A PHOSPHOR

Gerardus P. F. Hoeks, and Marinus G. A. Tak, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Continuation of Ser. No. 451,994, Dec. 21, 1982, abandoned.
This application Jul. 1, 1985, Ser. No. 750,663
Claims priority, application Netherlands, Dec. 21, 1981, 8105739
Int. Cl.[4] H01J *61/44;* C09K *11/08*
U.S. Cl. 313—486 **7 Claims**

1. A luminescent screen provided with a luminescent layer which is dispersed on a support and contains an alkaline earth metal aluminate activated by bivalent europium, the alkaline earth metal being barium of which up to 25 mol.% may be replaced by strontium, characterized in that the aluminate has a crystal structure, the X-ray powder diagram of which corre-

sponds at least substantially to the following X-ray powder diagram:

d(Å)	I	d(Å)	I	d(Å)	I
6.84	30	2.88	63	2.12	44
5.31	65	2.83	24	2.04	12
4.76	75	2.74	16	2.02	37
4.62	15	2.71	10	2.01	17
4.47	7	2.65	4	2.00	32
4.31	8	2.61	9	1.902	21
4.05	21	2.57	5	1.869	8
3.79	23	2.55	6	1.847	11
3.69	21	2.53	9	1.828	8
3.68	23	2.51	21	1.807	8
3.60	36	2.44	30	1.790	11
3.48	15	2.39	9	1.767	13
3.46	14	2.35	5	1.749	17
3.42	100	2.32	8	1.737	11
3.31	5	2.30	22	1.705	7
3.24	14	2.27	15	1.645	8
3.20	7	2.25	32	1.633	18
3.12	39	2.23	18	1.599	14
2.99	83	2.22	24	1.580	8
2.96	47	2.16	53	1.575	16
				1.568	11

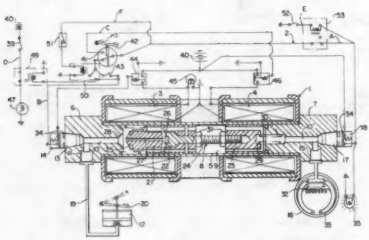
in which the molar ratio of the alkaline earth metal to aluminum in the aluminate is from 1:5 to 1:10.

4,590,406

AUTOMATIC BRAKE CONTROL SYSTEM

Jung Y. Ha, Seoul, Rep. of Korea, assignor to Kia Industrial Co., Ltd., Seoul, Rep. of Korea

Filed Jul. 31, 1984, Ser. No. 636,407
Int. Cl.⁴ B60Q *1/26*; F16D *23/00*
U.S. Cl. 315—80 **10 Claims**



1. An automatic brake control system for a vehicle comprising:

a casing defining a braking oil passage;

valve means within said casing for controlling the flow of braking oil, said valve means comprising a main check valve and a sub-check valve for sealing said oil passage;

first and second solenoid coils mounted at opposite ends of said casing for selectively operating said valve means; and

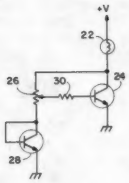
electric circuit means for selectively energizing said coils.

4,590,407

SCALE ILLUMINATION LAMP CONTROL CIRCUIT FOR AN OSCILLOSCOPE

Lloyd R. Bristol, Tigard, Oreg., assignor to Tektronix, Inc., Beaverton, Oreg.

Filed Feb. 3, 1984, Ser. No. 576,591
Claims priority, application Japan, Mar. 18, 1983, 58-38525[U]
Int. Cl.⁴ H05B *39/04, 37/02*
U.S. Cl. 315—208 **3 Claims**



1. A lamp control circuit, comprising:

a series connection of a lamp and the primary current path of a transistor connected between predetermined voltage sources;

a series connection of a potentiometer and a semiconductor junction connected between the collector and emitter of said transistor; and

a resistor coupled between the wiper arm of said potentiometer and the base of said transistor;

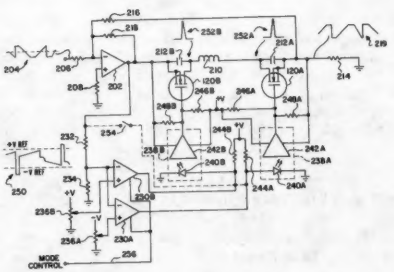
wherein said resistor and a selectable part of said potentiometer form a negative feedback path from the collector of said transistor to the base thereof.

4,590,408

LINEAR/RESONANT CRT BEAM DEFLECTION CIRCUIT

Joe A. Mays, Xenia, Ohio, assignor to Systems Research Laboratories, Inc., Dayton, Ohio

Filed May 8, 1984, Ser. No. 608,066
Int. Cl.⁴ H01J *29/70*
U.S. Cl. 315—403 **4 Claims**



1. A deflection control circuit for a cathode ray tube having a deflection coil to position the beam of the cathode ray tube along one coordinate, said deflection control circuit having both linear and bidirectional nonlinear operating modes and comprising:

amplifier means having an input for receiving beam positioning signals and an output for driving said deflection coil to position said cathode ray tube beam along said one coordinate;

first and second capacitor means for effecting rapid retrace of said cathode ray tube beam by resonant nonlinear oper-

ation with said deflection coil in either direction along said one coordinate, said first and second capacitor means being connected in series with said deflection coil and on opposite sides thereof with the series combination of said first and second capacitor means and said deflection coil being connected to the output of said amplifier means;

feedback means connected to the series combination of said first and second capacitor means and said deflection coil for providing a voltage representative of the current through said deflection coil to the input of said amplifier means; and

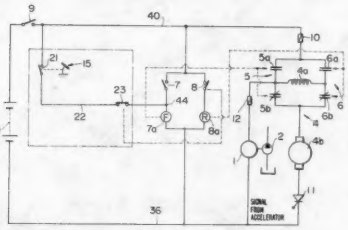
first and second bidirectional switching means connected in parallel with said first and second capacitor means, respectively, said first and second switching means being activated to shunt said first and second capacitor means for linear operation of said deflection control circuit and selectively deactivated for rapid retrace of said cathode ray tube beam in either direction along said one coordinate by resonant nonlinear operation.

4,590,409

CONTROL SYSTEM FOR A POWER STEERING MOTOR OF A BATTERY OPERATED VEHICLE

Toru Kubota, Koganei, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan

Continuation of Ser. No. 313,473, Oct. 21, 1981, abandoned. This application Jul. 13, 1984, Ser. No. 629,756
Claims priority, application Japan, Oct. 29, 1980, 55-151690
Int. Cl.[4] B62D *5/06*
U.S. Cl. 318—139 **4 Claims**



1. A control system for a wheeled vehicle having an electrical power source, an electric wheel drive motor, a power steering system operatively connected with said wheel drive motor, a power steering motor, and accelerator pedal, and a brake pedal having a brake apply position and a brake release position, comprising:

a power steering motor energization circuit, responsive to said brake pedal for energizing said power steering motor from said electrical power source when said brake pedal assumes said brake release position;

a wheel drive motor control circuit including:

(a) means responsive to the depression of said accelerator pedal for energizing said wheel drive motor from said electrical power source;

(b) forward drive switch means having an inactive state and an active state wherein, when said accelerator pedal is depressed, said wheel drive motor is energized to rotate in a forward drive direction; and

(c) reverse drive switch means having an inactive state and an active state wherein, when said accelerator pedal is depressed, said wheel drive motor is energized to rotate in a reverse drive direction;

said power steering motor being responsive to said forward and reverse drive switch means so as to be energized by said power source when one of said forward drive switch means and said reverse drive switch means is in its active state;

said forward drive switch means comprising a first manually operable switch and a first activator coil connected to said first switch and energized whenever said first switch is closed, said first activator coil forming part of a first relay for connecting said wheel drive motor to said electrical power source so that said wheel drive motor rotates in said forward drive direction, and wherein said reverse drive switch means comprises a second manually operable switch and a second activator coil connected to said second switch and energized whenever said second switch is closed, said second activator coil forming part of a second relay which connects said wheel drive motor with said electrical power source so that said wheel drive motor rotates in said reverse drive direction, and

wherein said power steering motor energization circuit comprises:

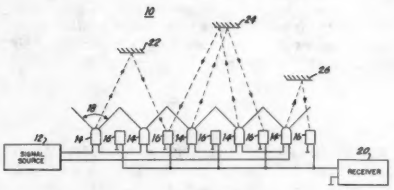
a third switch connected to said electrical power source and operable to close whenever said brake pedal assumes said brake release position, said third switch being open whenever said brake pedal assumes said brake apply position, and a fourth switch operable to close when said second switch is open and to open when said second switch is closed, said third and fourth switches and one of said first and second activator coils being connected in series so that when said third and fourth switches are closed, said one of said first and second activator coils is energized.

4,590,410

OBJECT SENSING APPARATUS

Bert O. Jönsson, Rödbena Vägen 6, Vintrie, Sweden (21615)

Division of Ser. No. 347,793, Feb. 11, 1982, which is a continuation-in-part of Ser. No. 155,008, May 30, 1980, abandoned. This application May 21, 1984, Ser. No. 612,433
Claims priority, application Sweden, May 31, 1979, 7904749
Int. Cl.[4] G05B *5/00*
U.S. Cl. 318—480 **4 Claims**



1. Obstacle detection apparatus comprising:

first and second transmitting arrays each having a plurality of radiation emitting elements spaced along a respective one of first and second mutually-parallel, spaced-apart, straight lines, said elements in each array including radiation beamwidth controlling means for providing a respective one of first and second selected diverging radiation beamwidths in an angular coordinate transverse to the line along which the elements are spaced, said elements of each array having a respective one of third and fourth wide radiation beamwidths in a plane including the line along which the elements are spaced, and said elements in each array having substantially the same beam direction, whereby the beams of said elements of the array overlap in said plane to form diffused illumination;

a receiving array comprising a plurality of radiation detecting elements spaced along a third straight line, parallel to and spaced from said first and second straight lines, said elements including beamwidth controlling means for providing a selected diverging first receiving beamwidth in an angular coordinate transverse to said third line, said detecting elements having a wide second receiving beamwidth in a plane including said third line, each of said detecting elements having substantially the same direction

of sensitivity whereby the beams of said elements overlap and said elements collectively respond to diffuse radiation;

means for simultaneously providing said emitter with electrical signals to be radiated;

and means for receiving signals detected by said detecting elements thereby to determine the presence of a radiation reflecting object within a region of space corresponding to said first and second transmitting and said first receiving beamwidths and the length of said arrays.

4,590,411

LINEAR MOTORS AND CONTROL CIRCUITRY THEREFOR

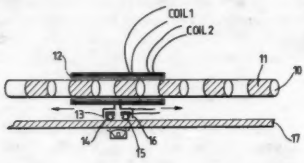
Hugh-Peter G. Kelly, 66, Westleigh Avenue, Lehigh-On-Sea, Essex, England

Filed Sep. 7, 1982, Ser. No. 415,383

Claims priority, application United Kingdom, Sep. 7, 1981, 8127003

Int. Cl.[4] G05B *11/00*

U.S. Cl. 318—687 **20 Claims**



1. A servo device comprising a position transducer having two relatively movable parts and at least one output, and circuitry comprising a digital counter, the digital counter having a plurality of outputs, the circuitry being adapted to provide a digital word representing the relative position of the two transducer parts, higher order bits of the digital word being derived from the outputs of said digital counter cycled by the output of the transducer and the lower order bit or bits being derived directly from the output of the position transducer.

4,590,412

METHOD OF ENERGIZING A STEPPING MOTOR

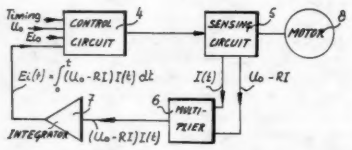
Mohamed Mokdad, Bienne, and Mai T. Xuan, Chavannes, both of Switzerland, assignors to Omega SA, Bienne, Switzerland

Filed Sep. 11, 1984, Ser. No. 649,338

Claims priority, application Switzerland, Sep. 16, 1983, 5050/83

Int. Cl.[4] H02P *8/00*

U.S. Cl. 318—696 **3 Claims**



1. A method of controlling the application of motor drive pulses having varying widths from an energy source having a changing internal resistance R_i to a stepping motor, said method comprising the steps of:

determining an energy threshold E_{io} to be supplied to the motor by a pulse for which stepping is assured in all cases of normally occurring loads;

continually measuring the instantaneous voltage U_o across the motor winding terminals and the instantaneous current I(t) circulating in said winding during a pulse supplied by said energy source, the values of said instantaneous voltage U_o and instantaneous current I(t) being dependent on the internal resistance R_i of said energy source;

continually calculating the difference $U_o - RI$ where R represents the winding resistance during said pulse;

continually forming the product $(U_o - RI)\, I(t)$ during said pulse;

continually integrating said product over a time period t during said pulse whereby the value of the integral represents the energy $E_i(t)$ supplied to the motor;

continually comparing the measured value $E_i(t)$ during said pulse to the predetermined threshold value E_{io}; and,

cutting off the energy supply when $E_i(t) = E_{io}$ to form the end of said pulse whereby the width of a motor drive pulse varies as the voltage U_o and the resistance R_i of the energy source vary to provide a predetermined quantity of energy equal to said energy threshold E_{io} to the motor winding.

4,590,413

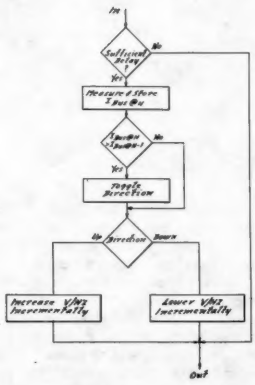
EV DRIVETRAIN INVERTER WITH V/HZ OPTIMIZATION

David J. Gritter, Southfield, and Walter K. O'Neil, Birmingham, both of Mich., assignors to Eaton Corporation, Cleveland, Ohio

Continuation of Ser. No. 338,743, Jan. 11, 1982, abandoned, which is a continuation of Ser. No. 186,874, Sep. 12, 1980, abandoned. This application Oct. 16, 1984, Ser. No. 661,541

Int. Cl.[4] H02P *5/40*

U.S. Cl. 318—803 **9 Claims**



1. An electric vehicle drivetrain comprising:

a D. C. power supply;

and A.C. induction motor for driving at least one ground engaging vehicle wheel;

an inverter which receives an input from said power supply through a substantially fixed D.C. bus and provides a PWM power output to said motor at a preselectable frequency and a preselectable voltage; and

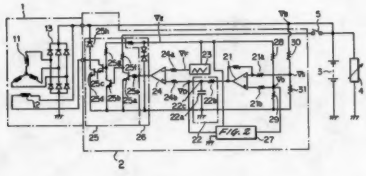
a control circuit operative to monitor current delivered through said bus, vehicle operator torque demand and torque delivered by said motor to said wheel, and periodically selectively adjust the ratio of said voltage and frequency only when said torques are substantially equal, as a function of a monitored net change in current effected by a previous ratio variation to minimize input energy through said bus under steady state operating conditions.

4,590,414

BATTERY VOLTAGE REGULATION SYSTEM

Nobuo Mayumi, Oobu; Hidetoshi Kato, Suzuka, and Hajime Matsuhashi, Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Dec. 12, 1984, Ser. No. 680,959
Claims priority, application Japan, Dec. 20, 1983, 58-240473
Int. Cl.[4] H02J 7/00
U.S. Cl. 320—64 6 Claims



1. a battery voltage regulating system for an automotive vehicle having a battery, an alternator driven by an internal combustion engine mounted on said vehicle and generating an alternating current, and a full-wave rectifier for rectifying said alternating current to charge said battery, comprising:

an operational amplifier connected to said battery for comparing a battery voltage with a reference voltage and for producing an output voltage which varies in response to a difference between said battery voltage and said reference voltage;

a generating circuit for generating a saw-tooth wave signal voltage;

a comparing circuit connected to said operational amplifier and said generating circuit for comparing said saw-tooth wave signal voltage with said output voltage;

a switching circuit having a power transistor connected to a field coil of said alternator and connected to said comparing circuit for controlling a current flow of a field current flowing through said field coil in accordance with a comparison between said saw-tooth wave signal voltage and said output voltage; and

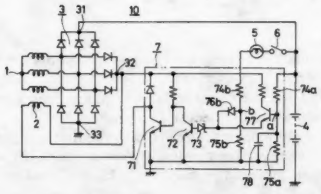
a reference voltage changing circuit for detecting a conduction ratio of said power transistor and changing said reference voltage in response to the detected conduction ratio so as to prevent the battery voltage from decreasing when the conduction ratio increases.

4,590,415

CONTROL APPARATUS FOR CHARGING GENERATOR

Yoshiyuki Iwaki, and Tadashi Katashima, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 18, 1984, Ser. No. 621,651
Claims priority, application Japan, Jul. 15, 1983, 58-130010
Int. Cl.[4] H02J 7/14
U.S. Cl. 320—64 5 Claims



1. A control apparatus for an AC charging generator having a field coil, comprising:

a storage battery coupled to be charged by a rectified output of said AC generator;

a switching transistor for on/off controlling a current flow through said field coil;

a control transistor for controlling said switching transistor;

a zener diode for energizing said control transistor having an anode connected to a base of said control transistor;

a smoothing capacitor;

a first detection circuit comprising a first voltage dividing resistance connected to said smoothing capacitor for detecting said rectified output and producing a substantially ripple free voltage at a first detection point;

a second detection circuit for producing a voltage at a second detection point which is higher than said first detection point voltage;

an amplifying transistor having a base connected to said first detection point and being selectively energized by the voltage level at said first detection point to energize said zener diode when the generator output reaches a selected level; and

a diode having an anode connected to said second detection point and a cathode connected to a cathode of said zener diode, said zener diode being coupled to be energized by either the output of said amplifying transistor or by an output of said second detection circuit,

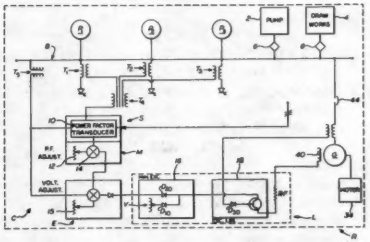
said amplifying transistor having a current amplification factor selected in dependence upon the values of said first voltage dividing resistance so that a smoothing capacitor with a small capacitance value and the first voltage dividing resistance with a large resistance value can be used to produce a substantially ripple free voltage at said first detection point while having a sufficient current to energize said zener diode when the generator output reaches said selected level.

4,590,416

CLOSED LOOP POWER FACTOR CONTROL FOR POWER SUPPLY SYSTEMS

Michael N. Porche, Houston, and Louis G. Beauregard, Stafford, both of Tex., assignors to Rig Efficiency, Inc., Houston, Tex.

Division of Ser. No. 521,119, Aug. 8, 1983, Pat. No. 4,482,857.
This application Nov. 9, 1984, Ser. No. 670,163
The portion of the term of this patent subsequent to Nov. 13, 2001, has been disclaimed.
Int. Cl.[4] G05F 1/70
U.S. Cl. 323—205 20 Claims



1. A method of controlling the system power factor of an alternating current power supply system having one or more engine-generator sets, comprising the steps of:

sensing the instantaneous system power factor;

comparing the sensed instantaneous power factor to a prescribed power factor;

forming a power factor control signal indicative of the difference between the sensed power factor and the prescribed power factor;

providing a field excitation signal to an unloaded, over-

excited generator operated in the motor mode in proportion to said power factor control signal to cause the over-excited generator to generate the requisite reactive power to correct the system's power factor to the prescribed power factor; and

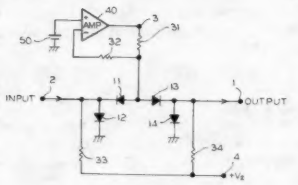
coupling the output of the over-excited generator to the power system.

4,590,417

VOLTAGE CONTROLLED DIODE ATTENUATOR

Shigeyuki Tanaami, and Osamu Yamamoto, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Jan. 22, 1985, Ser. No. 693,101
Claims priority, application Japan, Feb. 1, 1984, 59-17496
Int. Cl.[4] G05F *1/613*
U.S. Cl. 323—229 **10 Claims**



1. A voltage controlled diode attenuator comprising:

(a) first and second diodes connected in a series with their conducting direction coinciding with each other;

(b) a first resistor having one end connected to the first diode;

(c) first means for applying a predetermined dc bias voltage to the first and second diodes connected in series via the first resistor, said first means comprising a differential amplifier having first and second input terminals and an output terminal, said output terminal of said differential amplifier being connected to the other end of the first resistor, a reference voltage source connected to the first input terminal, and negative feedback means connected between the second input terminal and a junction of the first diode and the one end of the first resistor;

(d) second means for applying a variable control voltage to the second diode via a second resistor; and

(e) third means for applying a high frequency signal to a junction between the first and second diodes, being delivered to an output terminal of said diode attenuator said high frequency signal from the one end of the first resistor.

4,590,418

CIRCUIT FOR GENERATING A TEMPERATURE STABILIZED REFERENCE VOLTAGE

John K. Moriarty, Jr., Gaithersburg, Md., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 5, 1984, Ser. No. 668,427
Int. Cl.[4] G05F *3/30*
U.S. Cl. 323—313 **1 Claim**

1. A monolithic integrated circuit for producing a temperature independent output voltage V_R, comprising:

first and second matched bipolar junction transistors each having a base coupled together and to a reference voltage node, a collector and an emitter;

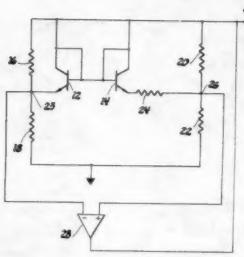
a first resistor coupled between the emitter of the first transistor and a common voltage node;

second and third resistors series coupled between the reference voltage node and the common voltage node; and

means for biasing the first and second transistors conductive including feedback means for providing a feedback voltage to the reference voltage node to establish respective base-emitter junction voltage values V_{be1} and V_{be2} each having a negative temperature coefficient,

the feedback means including a fourth resistor coupled between the emitter of the second transistor and a node between the second and third resistors and

a comparator amplifier having one input connected to the emitter of the first transistor, a second input connected to the node between the second and third resistors and an output coupled to the reference voltage node, the output of the comparator amplifier biasing the first and second transistors conductive so as to establish the voltage value V_{be1} across the second resistor resulting in a voltage



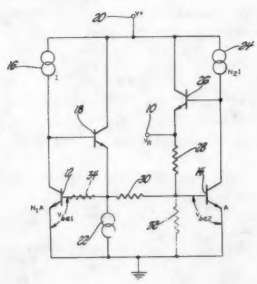
across the fourth resistor that is equal to the value $V_{be2}-V_{be1}$ having a positive temperature coefficient, whereby the currents through the second and third resistors establish a voltage across the fourth resistor having a value $K_1V_{be1}+K_2(V_{be2}-V_{be1})$ where K_1 and K_2 are scaling factors determined by the second, third and fourth resistors, the sum of the voltages across the second and third resistors at the reference voltage node comprising the regulated output voltage V_R.

4,590,419

CIRCUIT FOR GENERATING A TEMPERATURE-STABILIZED REFERENCE VOLTAGE

John K. Moriarty, Jr., Gaithersburg, Md., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 5, 1984, Ser. No. 668,428
Int. Cl.[4] G05F *3/30*
U.S. Cl. 323—313 **2 Claims**



1. A monolithic integrated circuit for producing an output voltage V_R, comprising:

first and second matched bipolar junction transistors each having a base, collector and emitter;

means for coupling the emitters of the first and second transistors so that their potentials are substantially equal;

means for providing a bias to the base of the first transistor to establish the base-emitter junction current density of the first transistor at a constant first value to provide a base-emitter junction voltage value V_{be1} having a negative temperature coefficient;

a feedback circuit responsive to the emitter current of the second transistor for biasing the base of the second transistor to maintain a base-emitter junction current density of the second transistor at a constant second value to provide a base-emitter junction voltage value V_{be2} having a negative temperature coefficient;

a resistor coupled between the bases of the first and second transistors so as to develop across the resistor a voltage substantially equal to $V_{be2}-V_{be1}$, the value $V_{be2}-V_{be1}$ having a positive temperature coefficient; and

resistance means in the feedback circuit series coupled with the base-emitter junction of the second transistor, the sum of the voltage across the resistance means and the base-emitter junction of the second transistor comprising the output voltage V_R having the value $K_1(V_{be2}-V_{be1})+K_2V_{be2}$, where K_1 and K_2 are factors determined to provide the voltage V_R equal to K_2V_{go}, where V_{go} is the semiconductor band gap voltage extrapolated to absolute zero, whereby the voltage V_R is substantially independent of variations in temperature.

4,590,420

APPARATUS FOR TESTING PLASTIC PROFILES BY A MAGNETICALLY SUSPENDED PROBE

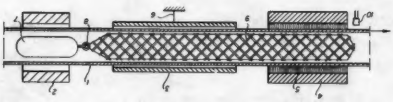
Ludwig Neueder, Amselstrasse 9, D-8443 Furth, Fed. Rep. of Germany

Filed Dec. 21, 1983, Ser. No. 564,243

Claims priority, application Fed. Rep. of Germany, Dec. 23, 1982, 3247852

Int. Cl.⁴ G01R *31/02, 31/06;* **B61B** *13/00*

U.S. Cl. 324—54 **10 Claims**



1. Apparatus for testing plastic tubes for faults characterized in that a moving plastic tube (1) is surrounded by a first electrode and by a second electrode, which is properly spaced from the first, one electrode is connected to a voltage source, the other electrode is grounded and is insulated from the first electrode, and a probe (9) is disposed inside the plastic tube (1) and extends therein at least from the beginning of the first electrode to the end of the second electrode and is secured by means of an insulator to a floating element, which is held in position by a magnet surrounding the moving plastic tube, said probe cooperating with said electrodes to generate an electric field which changes in the presence of a tube fault.

4,590,421

MEASURING ATTACHMENT CONNECTIBLE TO A MULTIMETER FOR MEASURING EARTH RESISTANCES

Daniel Arnoux, St. Germain en Laye; Jean Bousquet, Domont, and Claude Genter, Paris, all of France, assignors to Chauvin Arnoux, Paris, France

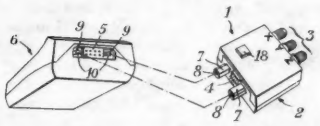
Filed Nov. 7, 1983, Ser. No. 549,457

Claims priority, application France, Nov. 10, 1982, 82 18860

Int. Cl.⁴ G01R *27/02, 27/26*

U.S. Cl. 324—62 **5 Claims**

1. Measuring attachment connectible to a multimeter for measuring and direct reading earth resistances, comprising a casing having a first group of three terminals for an AC signal to be injected into the earth and for a measurement signal, and a second group of terminals for electrical connection of the attachment to the multimeter, and electric circuits housed in the casing and connected electrically to the terminals of the first and second groups of terminals, said electric circuits comprising generator means for generating, as said AC signal, and AC current of constant predetermined value and of a frequency different from that of the mains and its harmonics, said generator means having an output connected to first and second terminals of said first group of terminals, and a detector



circuit having a measurement signal input which is connected to the second terminal and to a third terminal of said first group of terminals and an output which is connected to first and second terminals of said second group of terminals.

4,590,422

AUTOMATIC WAFER PROBER HAVING A PROBE SCRUB ROUTINE

Vernon C. Milligan, Los Altos, Calif., assignor to Pacific Western Systems, Inc., Mountain View, Calif.

Filed Jul. 30, 1981, Ser. No. 288,454

Int. Cl.⁴ G01R *31/02, 1/06;* **B24B** *7/00;* **B08B** *7/00*

U.S. Cl. 324—158 F **10 Claims**

5. In an automatic wafer prober of the type having an array of wafer probes for sequentially making electrical contact to an array of contact pads of each die to be tested on a wafer;

stepping means for automatically stepping the wafer prober in a sequence to selected die on a wafer for electrically testing the probed die; and

scrub block means disposed proximate the wafer for cleaning the probe tips by scrubbing the tips on a planar scrubbing surface of said scrub block means;

said stepping means including means for automatically stepping the probe tips at right angles relative to the scrubbing surface so that in response to the stepping the (a) probe tips and the planar scrubbing surface contact and (b) while the tips and planar scrubbing surface contact the tips are deflected onto and along the planar scrubbing surface to produce a rubbing action which cleans the tips without damaging the tips.

4,590,423

COAXIAL TEST FIXTURE

Walter F. Praeg, Palos Park, Ill., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 30, 1984, Ser. No. 595,014

Int. Cl.⁴ G01R *31/00, 27/00*

U.S. Cl. 324—158 F **18 Claims**

1. A test fixture for subjecting a test specimen having first and second ends with contact surfaces on each end, to a test current flowing therethrough, comprising:

an electrically conductive generally cylindrical vacuum enclosure having a first closed end with a first contact surface, and a second end;

a generally cylindrical inner conductor assembly concentrically disposed within said vacuum enclosure, including a

first end with a second contact surface which is spaced apart from said first contact surface to form a gap for receiving said test specimen therebetween, said inner conductor assembly further including a second end;

a load connection means for applying a pressure force to said second end of said inner conductor assembly, said pressure force being transmitted to said second contact surface of said inner conductor assembly, said test specimen, and said first contact surface, to hold said test specimen in a fixed position between said first and said second contact surfaces, with a predetermined contact pressure;

first and second connection means for connecting said second ends of said inner conductor assembly and said vacuum enclosure, respectively, to an external test current source, such that said test current is driven through said first and said second contacts and said test specimen;

said cylindrical vacuum enclosure providing a return current path for test currents driven through said inner conductor assembly and said test specimen by said external test current source;

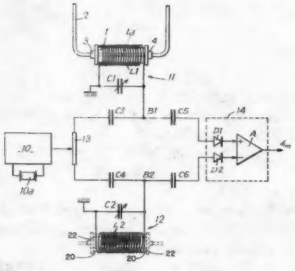
said test specimen disposed within said vacuum enclosure such that a vacuum environment is provided for said test specimen during said testing, and magnetic forces created by said test current flowing through said test specimen are prevented from altering said predetermined contact pressure.

4,590,424

DETECTION OF ION CONCENTRATION IN A LIQUID

Pierre Girot, Paris, and Egisto Boschetti, Chatou, both of France, assignors to Pharmuka Laboratoires, Gennevilliers, France

Filed Sep. 23, 1983, Ser. No. 535,307
Claims priority, application France, Sep. 28, 1982, 82 16303
Int. Cl.[4] G01N *27/74*
U.S. Cl. 324—204 **3 Claims**



1. Detector of ion concentration in a liquid comprising:

a detection cell consisting of a tubular piece made from an electrically insulating material with a central passage through which the liquid whose ion concentration is to be measured is to flow, and

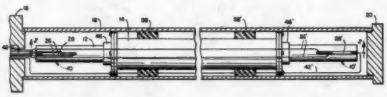
an electric circuit including an oscillator for generating a signal having a fixed frequency, a first resonant circuit comprising a conducting coil placed around said tubular piece, a second reference resonant circuit, said first and second resonant circuits being connected in parallel to the oscillator to be energized by the output signal thereof, and a comparator having a first and a second inputs for receiving the signals produced respectively by the first and second resonant circuits and delivering a signal whose amplitude represents the difference between the signals that it receives.

4,590,425

MAGNETIC DETECTOR APPARATUS WITH EXCITATION CONDUCTORS CONNECTED IN SERIES VIA SENSOR HOUSING

Erick O. Schonstedt, Reston, Va., assignor to Schonstedt Instrument Company, Reston, Va.

Division of Ser. No. 391,441, Jun. 23, 1982, Pat. No. 4,539,522.
This application Mar. 21, 1985, Ser. No. 714,439
Int. Cl.[4] G01R *33/02*; H01R *11/22*
U.S. Cl. 324—244 **4 Claims**



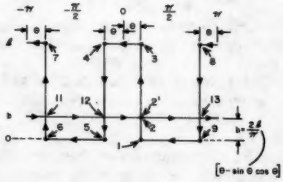
1. Magnetic detector apparatus including a pair of magnetic sensor assemblies and a non-magnetic electrically conducting sensor housing supporting the assemblies in spaced apart relation, each sensor assembly including a signal winding, a magnetic core, and an excitation conductor extending along the core for exciting the same, wherein the excitation conductors are connected in series by conducting path means including the sensor housing, and wherein the excitation conductors are electrically connected to the housing at points that are separated by a large distance compared to the length of each excitation conductor.

4,590,426

B_{zz} AND B_{yz} SENSE LOOP GEOMETRIES FOR CYLINDRICAL TENSOR GRADIOMETER LOOP STRUCTURES

Charles L. Lutes, Farmington, Minn., assignor to Sperry Corporation, New York, N.Y.

Filed Dec. 8, 1983, Ser. No. 559,580
Int. Cl.[4] G01R *33/02*
U.S. Cl. 324—248 **8 Claims**



1. A superconducting loop path patterned upon a cylindrical substrate of radius a and of length l, which said loop path is of a particular geometry useful as a one sense loop within a five loop cylindrical tensor gradiometer, which said loop path is electrically continuous save only for one only break point anywhere upon said loop at which said break point said loop is

broken and is electrically connected to a current sensor, said superconducting loop path of a particular geometry characterized in that

said loop path is a segmented continuous, save for a break point anywhere upon said loop path which break point momentarily breaks continuousness of said loop path, electrically superconducting path made upon the surface of said cylindrical substrate in ordered interconnection of the following points, each which point is defined by the coordinates (d, ϕ) wherein d is the displacement 0 to l along the axis of said cylindrical substrate and wherein ϕ is the angle in radians from $-\pi$ to π which is subtended by an arc of the circumference of said cylindrical substrate:

point **1** coordinates (0, θ) linearly in a first direction to

point **2** coordinates (b, θ) clockwise to

point **2'** coordinates (b', θ') colinearly in said first direction to

point **3** coordinates (l, θ) counterclockwise to

point **4** coordinates (l, $-\theta$) linearly oppositely to said first direction to

point **5** coordinates (0, $-\theta$) counterclockwise to

point **6** coordinates (0, $-\pi+\theta$) linearly in said first direction to

point **7** coordinates (l, $-\pi+\theta$) counterclockwise to

point **8** coordinates (l, $\pi-\theta$) linearly oppositely to said first direction to

point **9** coordinates (0, $\pi-\theta$) counterclockwise returning to

point **1** coordinates (0, θ)

wherein the coordinates (b', θ') of point **2'** essentially equal the coordinates (b, θ) of point **2** save only that within the superconducting path from point **1** to point **2**, which point **2** is of essentially equal coordinates to point **2'**, and thence to point **3** the said point **2'** is not in electrical connection with point **2**;

wherein θ is less than or equal to $\pi/2$ radians;

wherein b equals $2l/\pi(\theta-\sin\theta\cos\theta)$; and

wherein said electrically superconducting loop path of a particular geometry upon a cylindrical substrate is useful as one sense loop within a five loop cylindrical tensor gradiometer.

4,590,427

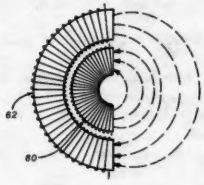
NUCLEAR MAGNETIC RESONANCE APPARATUS HAVING SEMITOROIDAL RF COIL FOR USE IN TOPICAL NMR AND NMR IMAGING

Eiichi Fukushima, Los Alamos, N. Mex.; Stephen B. W. Roeder, La Mesa, Calif.; Roger A. Assink, Albuquerque, N. Mex., and Atholl A. V. Gibson, Bryan, Tex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Mar. 28, 1983, Ser. No. 479,581

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—318 **19 Claims**



1. In a nuclear magnetic resonance (NMR) spectrometer, the improvement comprising a semitoroidal primary radio-frequency (rf) coil for irradiating a sample with an alternating magnetic field.

4,590,428

ELECTROMAGNET FOR NMR TOMOGRAPHY

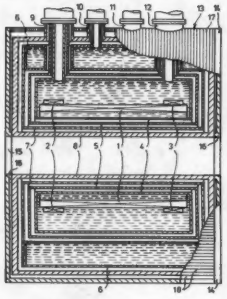
Wolfgang Müller, Karlsruhe, and Bertold Knüttel, Rheinstetten, both of Fed. Rep. of Germany, assignors to Bruker Analytische Messtechnik GmbH, Rheinstetten-Forchheim, Fed. Rep. of Germany

Filed Dec. 8, 1983, Ser. No. 559,868

Claims priority, application Fed. Rep. of Germany, Dec. 11, 1982, 3245945

Int. Cl.[4] G01R *33/20*

U.S. Cl. 324—320 **15 Claims**



1. An electromagnet for producing a constant magnetic field as required for use in NMR tomography of a body to be examined,

the electromagnet including a coil system having an axial interior space therein for receiving the body to be examined,

the coil system including at least one circular cylindrical field coil and at least one correction coil coaxial with the field coil,

the field coil and the correction coil being dimensioned and positioned to produce a substantially homogeneous magnetic field in the interior space,

the coil system being superconductive and having a cryogenic coling system including a Dewar container surrounding the coil system,

and a ferromagnetic cylindrical shell surrounding the Dewar container and affording a return magnetic path and a magnetic shield for the coil system while affording shielding for the Dewar container.

4,590,429

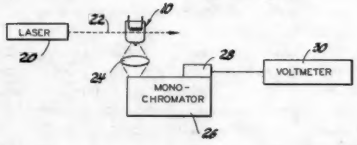
NONDESTRUCTIVE MEASUREMENT OF OXYGEN LEVEL IN A TUNGSTEN-HALOGEN INCANDESCENT BULB

Jeffrey A. Sell, Huntington Woods, Mich., assignor to General Motors Corporation, Detroit, Mich.

Filed Nov. 16, 1983, Ser. No. 552,251

Int. Cl.[4] H01J *9/42*

U.S. Cl. 324—414 **2 Claims**



1. A method of determining whether the oxygen content of a fill gas of a tungsten filament-halogen incandescent light bulb

with a transparent envelope meets a predetermined standard, comprising

passing a current through the tungsten filament of a previously unlit bulb for a short period of time to disperse particles of tungsten oxide in the fill gas of the bulb,

immediately directing a beam of monochromatic light through the dispersed particles whereby some of the light is scattered,

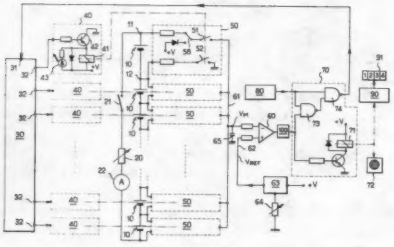
detecting the amount of light scattered in a particular direction, and

comparing such value with data obtained in a like manner from bulbs known to have a suitable oxygen content.

4,590,430
APPARATUS FOR MONITORING CELL CAPACITY IN A STORAGE BATTERY

Claude Vandenberghe, and André Le Morvan, both of St Quentin, France, assignors to Electricite de France (Service National), Paris, France

Filed Dec. 7, 1983, Ser. No. 558,792
Claims priority, application France, Dec. 13, 1982, 82 20859
Int. Cl.⁴ G01N *27/46*
U.S. Cl. 324—427 **7 Claims**



1. Apparatus for monitoring the capacity of a battery of series-connected storage cells, said battery being discharged at constant current when under test, and cells of said battery being successively disconnected from said battery when the voltage across the corresponding cell drops below a predetermined threshold, the discharging further continuing for the rest of the battery with the current being kept to the same constant value, comprising:

(a) sequencer means for cyclically addressing each battery cell in turn, said sequencer means being suitable for delivering a single measurement signal representative of the voltage across terminals of the cell being addressed;

(b) comparator means connected to receive said single measurement signal and to deliver an active output condition when said single measurement signal is below a threshold value representing end-of-discharge voltage for the cells under test;

(c) inhibiting means for suspending operation of said sequencer means while said comparator means are delivering said active output condition;

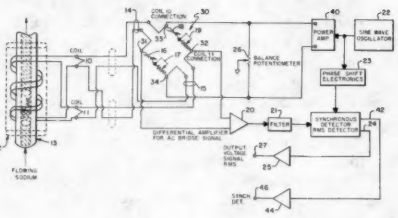
(d) timer means responsive to said active output condition being delivered by said comparator means to indicate the discharge time of the cell responsible for causing said active output condition to be delivered; and

(e) enabling means for disabling said inhibiting means, so as to enable said sequencer means to restart operation after said operation has been suspended by said inhibiting means and said responsible cell has been disconnected from said battery.

4,590,431
INDUCTION VOIDMETER

Thomas T. Anderson, Downers Grove; Conard J. Roop, Lockport; Kenneth J. Schmidt, Midlothian, and John Brewer, Oak Lawn, all of Ill., assignors to The United States of America as represented by the Department of Energy, Washington, D.C.

Filed Dec. 21, 1983, Ser. No. 564,129
Int. Cl.⁴ G01N *27/02*
U.S. Cl. 324—443 **12 Claims**



1. Apparatus for detecting voids in a conductive fluid comprising:

a four arm bridge circuit having two adjustable circuit element connected as opposing arms of said bridge circuit, an input branch, and an output branch;

two induction coils, bifilarly wound together, connected as the remaining two opposing arms of said bridge circuit, and positioned such that the conductive fluid passes through said coils;

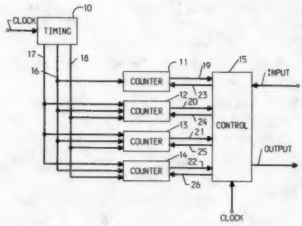
means for applying an AC excitation signal to said input branch; and

means for detecting the output signal generated in response to said excitation signal across said output branch.

4,590,432
CONSTANT-PERCENT BREAK PULSE CORRECTOR

Eugenio S. di Borgoricco, Winchester, Mass., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed May 21, 1984, Ser. No. 612,347
Int. Cl.⁴ H04Q *1/36;* H04M *3/00*
U.S. Cl. 328—164 **15 Claims**



1. A constant-percent break interval pulse corrector comprising,

means for generating a delay interval initiated from the leading edge of a pulse being corrected,

means for generating a plurality of clock signals each at a predetermined clock rate,

at least one up/down counter being supplied with said plurality of clock signals, and

means responsive to a pulse to be corrected and outputs from said delay interval generating means and said at least one up/down counter for generating control signals to cause said at least one up/down counter to count up at a first predetermined clock rate for an interval equal to said

delay interval, to count down at a second predetermined clock rate from the end of said delay interval until a leading edge of a next subsequent pulse to be corrected occurs and then to count down at a third predetermined clock rate until a predetermined count is reached, wherein the break interval of the corrected pulse is the interval from the end of said delay interval to said up/down counter reaching said predetermined count.

4,590,433

DOUBLED BALANCED DIFFERENTIAL AMPLIFIER CIRCUIT WITH LOW POWER CONSUMPTION FOR FM MODULATION OR DEMODULATION

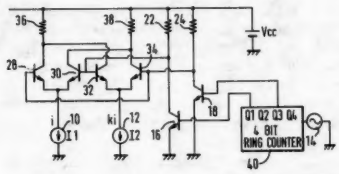
Hiromi Kusakabe, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Apr. 2, 1984, Ser. No. 596,024

Claims priority, application Japan, Mar. 31, 1983, 58-56089

Int. Cl.⁴ H03D *1/18, 3/00;* **H03K** *3/281, 17/60*

U.S. Cl. 329—50 **4 Claims**



1. A switching apparatus comprising:

(a) first and second power source terminals;

(b) first and second switching signal generators;

(c) first and second loads;

(d) switching means for selectively coupling said first and second generators and said first and second loads between said power source terminals in response to first and second control signals, said switching means including a first pair of transistors having current paths connected to selectively couple said first and second loads in series with said first and second signal generators, respectively, in response to said first control signal, and said switching means including a second pair of transistors having current paths connected to selectively couple said first and second loads in series with said second and first signal generators, respectively, in response to said second control signal; and

(e) means for generating said first and second control signals, with said first and second control signals rendering at least said current paths of one of said first and second pairs of transistors fully conductive prior to termination of conductivity of the current paths of either said first or second pair of transistors.

4,590,434

HIGH DYNAMIC RANGE AMPLIFIER WITH LOW NOISE AND LOW DISTORTION

Walter D. Wagner, Nashua, N.H., assignor to New England Microwave Corporation, Hudson, N.H.

Filed May 6, 1983, Ser. No. 492,128

Int. Cl.⁴ H03F *1/34*

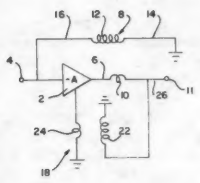
U.S. Cl. 330—102 **13 Claims**

1. Apparatus for amplification of an input signal comprising

a three-terminal amplifier having first and second input terminals and an output terminal,

first feedback means comprising a first non-dissipative means connected to said output terminal and to said first input terminal for providing current feedback,

second feedback means comprising a second non-dissipative means connected to said output terminal and to said second input terminal of said amplifier to provide a voltage feedback in series with an input signal.



4,590,435

HIGH INPUT IMPEDANCE DIFFERENTIAL AMPLIFIER

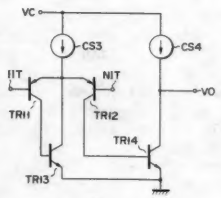
Tatsuo Tanaka, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Japan

Filed Mar. 5, 1985, Ser. No. 708,523

Claims priority, application Japan, Mar. 6, 1984, 59-42755

Int. Cl.⁴ H03F *3/45*

U.S. Cl. 330—258 **12 Claims**



1. A differential amplifier comprising:

first and second power source terminals;

first and second input terminals and an output terminal;

first and second current sources each having one end coupled to said first power source terminal;

first and second transistors of one conductivity type having bases respectively connected to said first and second input terminals and emitters coupled to the other end of said first current source;

a third transistor of an opposite conductivity type having a base, collector and emitter respectively coupled to a collector of said first transistor, the other end of said first current source and said second power source terminal; and

a fourth transistor of the opposite conductivity type having a base and emitter respectively coupled to a collector of said second transistor and said second power source terminal and a collector coupled to the other end of said second current source and to said output terminal.

4,590,436

HIGH VOLTAGE, HIGH FREQUENCY AMPLIFIER CIRCUIT

Scott J. Butler, Auburn; Robert J. Regan, Needham, and Anthony B. Varallo, Lynn, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Apr. 27, 1984, Ser. No. 604,778

Int. Cl.⁴ H03F *3/26, 3/68*

U.S. Cl. 330—277 **7 Claims**

1. High frequency amplifying circuitry comprising

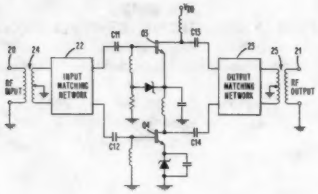
an input connection;

an output connection;

first and second transistors each having gate, drain, and source electrodes;

input means coupling said input connection to the gate electrode of the first transistor and to the gate electrode of the second transistor, said input means including a first dc blocking capacitance between the gate electrode of the first transistor and the gate electrode of the second transistor and preventing the flow of dc current between the gate electrode of the first transistor and the gate electrode of the second transistor;

output means coupling the drain electrode of the first transistor and the drain electrode of the second transistor to said output connection, said output means including a second dc blocking capacitance between the drain electrode of the first transistor and the drain electrode of the second transistor and preventing the flow of dc current between the drain electrode of the first transistor and the drain electrode of the second transistor;



whereby parallel first and second ac conductive paths are provided between the input connection and the output connection through the first transistor and the second transistor, respectively;

a single dc conductive path between a source of operating potential and a reference potential, said path being through the first transistor and the second transistor in series, said path blocking ac current flow therethrough, and said path comprising

means including an ac blocking inductance for connecting the drain electrode of the first transistor to said source of operating potential;

means for connecting the source electrode of the second transistor to said reference potential; and

ac blocking inductance means coupling the source electrode of the first transistor to the drain electrode of the second transistor.

4,590,437

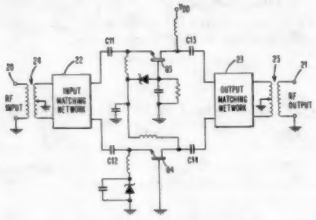
HIGH FREQUENCY AMPLIFIER

Scott J. Butler, Auburn; Robert J. Regan, Needham, and Anthony B. Varallo, Lynn, all of Mass., assignors to GTE Laboratories Incorporated, Waltham, Mass.

Filed Apr. 27, 1984, Ser. No. 604,779

Int. Cl.[4] H03F *3/26, 3/68*

U.S. Cl. 330—277 **7 Claims**



1. High frequency amplifying circuitry comprising

an input connection;

an output connection;

first and second transistors each having source, drain, and gate electrodes;

input means coupling said input connection to the source electrode of the first transistor and to the source electrode of the second transistor, said input means including a first dc blocking capacitance between the source electrode of the first transistor and the source electrode of the second transistor and preventing the flow of dc current between the source electrode of the first transistor and the source electrode of the second transistor;

output means coupling the drain electrode of the first transistor and the drain electrode of the second transistor to said output connection, said output means including a second dc blocking capacitance between the drain electrode of the first transistor and the drain electrode of the second transistor and preventing the flow of dc current between the drain electrode of the first transistor and the drain electrode of the second transistor;

whereby parallel first and second ac conductive paths are provided between the input connection and the output connection through the first transistor and the second transistor, respectively;

a single dc conductive path between a source of operating potential and a reference potential, said path being through the first transistor and the second transistor in series, said path blocking ac current flow therethrough, and said path comprising

means including an ac blocking inductance for connecting the drain electrode of the first transistor to said source of operating potential;

means for connecting the gate electrode of the second transistor to said reference potential; and

ac blocking inductance means coupling the source electrode of the first transistor to the drain electrode of the second transistor.

4,590,438

BIPOLAR TRANSISTOR CIRCUIT WITH FET CONSTANT CURRENT SOURCE

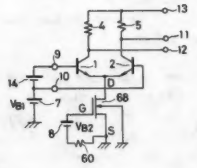
Isao Fukushima; Yasunori Kobori, and Hideo Nishijima, all of Katsuta, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 31, 1983, Ser. No. 499,246

Claims priority, application Japan, May 31, 1982, 57-91225

Int. Cl.[4] H03F *3/16*

U.S. Cl. 330—300 **8 Claims**



1. A transistor circuit comprising:

(a) a cascade connection of differential pairs of bipolar transistors,

(b) a first group of FETs, each of which has a drain, a source and a gate, said FETs each being connected to a common ground-line in a common source mode, and the drain of each of said FETs being connected to the emitter of a different pair of said differential pairs of bipolar transistors,

(c) bias supply means connected to the gates of said first group of FETs,

(d) emitter-follower bipolar transistors inserted between adjacent differential pairs of bipolar transistors to operate as buffers between said adjacent pairs, and

(e) a second group of FETs, each of which has a drain, a source and a gate, the drains of which are respectively

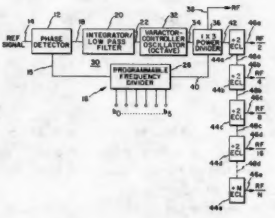
connected to emitters of said emitter-follower bipolar transistors, and the sources of which are connected to said common ground-line, wherein said bias supply means supplies biases to the gates of said second group of FETs.

4,590,439

FREQUENCY SYNTHESIZING CIRCUIT

John C. Goggin, Dallas, Tex., assignor to E-Systems, Inc., Dallas, Tex.

Filed May 7, 1984, Ser. No. 607,636
Int. Cl.[4] H03L *7/00*
U.S. Cl. 331—1 A **17 Claims**



1. A frequency synthesizer of the phase-locked loop type for receiving a reference signal and generating a plurality of local oscillator output signals, comprising:

a varactor-controlled oscillator means comprising an RF operational amplifier having an input terminal and an output terminal, and a LC tank circuit connected between said input and output terminals and having one or more hyperabrupt varactor tuning diodes and a center-tapped inductor, the center tap of said inductor providing a phase-locked loop output signal RF;

phase detector means having first and second inputs, and an output connected to said input of said RF operational amplifier of the oscillator means, said first input connected to receive said reference signal and said second input connected to receive said output signal RF; and

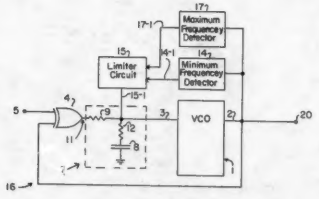
coupling means connected to said varactor-controlled oscillator means for receiving said phase-locked loop output signal RF and generating in response thereto a plurality of local oscillator output signals RF/N, where $N=2^x$, $x=1, 2, 3 \ldots$.

4,590,440

PHASE LOCKED LOOP WITH HIGH AND/OR LOW FREQUENCY LIMIT DETECTORS FOR PREVENTING FALSE LOCK ON HARMONICS

Yusuf A. Haque, and Ashraf K. Takla, both of San Jose, Calif., assignors to American Microsystems, Inc., Santa Clara, Calif.

Filed Jul. 6, 1984, Ser. No. 628,608
Int. Cl.[4] H03L *7/06*
U.S. Cl. 331—17 **21 Claims**



8. A phase locked loop circuit having an inut terminal for receiving an input signal and an output terminal for providing a signal in response to said input signal, comprising:

phase detection means having a first input lead, a second input lead connected to said input terminal, and having an output lead;

integrator means having an input lead connected to said output lead of said phase detection means, and having an output lead;

a voltage controlled oscillator having a control voltage input lead connected to said output lead of said integrator means and an output lead connected to said first input lead of said phase detection means;

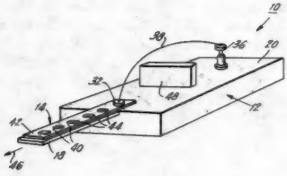
frequency detection means for detecting when an input signal has a frequency greater than a predetermined frequency, having an input lead connected to said output lead of said voltage controlled oscillator and an output lead connected to said control voltage input lead, wherein said frequency detection means provides a signal to said voltage controlled oscillator to lower the frequency of said output signal of said voltage controlled oscillator when said frequency detection means detects that said input signal has a frequency greater than said predetermined frequency.

4,590,441

FILTER REFLECTION IMAGE GUIDE OSCILLATOR AND SOLID STATE LINE SCANNING DEVICE

Harold Jacobs, deceased, late of West Long Branch (by Lydia S. Jacobs, executrix), and Robert E. Horn, Middletown, both of N.J., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Dec. 10, 1984, Ser. No. 679,970
Int. Cl.[4] H03B *5/36*
U.S. Cl. 331—107 DP **21 Claims**



1. An image guide oscillator device, comprising:

a metal base;

a semiconductor waveguide mounted atop said metal base, said waveguide having a resonant cavity defined therein, and exposing a portion of said metal base;

an adjustable oscillator means mounted atop said metal base and disposed within said resonant cavity for generating variable electromagnetic waves along the length of said waveguide: and

a plurality of evenly spaced metal perturbations positioned transversely atop said semiconductor waveguide.

4,590,442

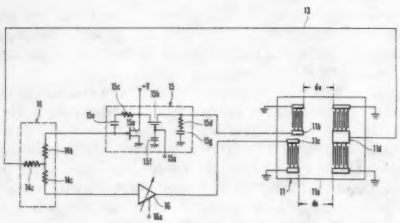
VARIABLE HIGH FREQUENCY OSCILLATOR

Shigeki Saito, Yokohama, and Shuuji Urabe, Yokosuka, both of Japan, assignors to Nippon Telegraph & Telephone Corporation, Tokyo, Japan

PCT No. PCT/JP83/00159, § 371 Date Nov. 18, 1983, § 102(e) Date Nov. 18, 1983, PCT Pub. No. WO83/04350, PCT Pub. Date Dec. 8, 1983
PCT Filed May 25, 1983, Ser. No. 557,132
Claims priority, application Japan, May 25, 1982, 57-87221; May 24, 1983, 58-90071
Int. Cl.[4] H03B *19/14;* H03H *9/00*
U.S. Cl. 331—107 A **21 Claims**

1. A variable frequency oscillator. characterized by compris-

ing a power divider which divides an input signal into a plurality of output signals, a plurality of variable gain amplifiers respectively amplifying the output signals of said power divider and having control terminals receiving gain control inputs, and a first surface acoustic wave coupling element having at least one interdigital output electrode arranged on



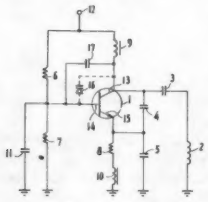
one surface and a plurality of interdigital input electrodes disposed at positions spaced from said output electrode by different distances and supplied with corresponding output signals of said variable gain amplifiers, and said at least one output electrode of said surface acoustic wave coupling element being connected to the input side of said power divider so as to form a positive feed back circuit.

4,590,443

TRANSISTOR OSCILLATOR WITH COMPENSATING CIRCUIT FOR VARIABLE COLLECTOR-BASE CAPACITANCE

Isao Ishigaki, Sagamihara; Mitsuo Makimoto, Yokohama, and Sadahiko Yamashita, Sagamihara, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

Filed Mar. 8, 1985, Ser. No. 709,717
Claims priority, application Japan, Mar. 9, 1984, 59-45835
Int. Cl.[4] H03B *5/12;* **H03L** *1/00*
U.S. Cl. 331—117 R **10 Claims**



1. An oscillator comprising:

a transistor having a base, a collector and an emitter;

means for supplying a first voltage to said collector from a voltage source;

means for supplying a second voltage to said base from said voltage source;

a resonant circuit connected to said emitter and collector for generating a high frequency oscillation in said transistor;

means for coupling the high frequency oscillation developed at said base to ground; and

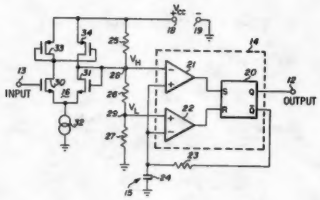
a capacitive circuit externally coupled between said collector and base for eliminating the effect of a voltage-dependent variable capacitance inherently present in said transistor between said collector and base on the frequency of said oscillation.

4,590,444

VOLTAGE CONTROLLED RC OSCILLATOR CIRCUIT

Milton E. Wilcox, Saratoga, Calif., assignor to National Semiconductor Corporation, Santa Clara, Calif.

Filed Oct. 11, 1984, Ser. No. 659,793
Int. Cl.[4] H03K *3/023, 3/03*
U.S. Cl. 331—111 **4 Claims**



1. A voltage controlled oscillator circuit having an input terminal to which a frequency controlling voltage can be applied and an output terminal at which an oscillatory signal appears, said circuit comprising:

first and second supply terminals connectible to a source of operating power;

a relaxation oscillator including high and low comparators coupled to drive the R and S inputs of an RS flip-flop having an output terminal which constitutes said circuit output terminal, said relaxation oscillator having a control input terminal and a feedback input terminal;

said relaxation oscillator further including a frequency determining capacitor coupled between said feedback input terminal and one of said supply terminals and a frequency determining resistor coupled between said relaxation oscillator output and feedback input terminals whereby said relaxation oscillator will oscillate to charge and discharge said capacitor; and

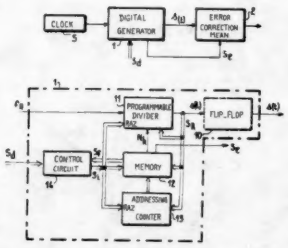
a voltage follower buffer coupled between said circuit input terminal and said control input terminal of said relaxation oscillator.

4,590,445

DEVICE FOR GENERATING A FREQUENCY MODULATED SIGNAL

Remy Tabourier, Sceaux, and Jean M. Quintric, Paris, both of France, assignors to Thomson-CSF, Paris, France

Filed Jun. 14, 1984, Ser. No. 620,623
Claims priority, application France, Jun. 28, 1983, 83 10676
Int. Cl.[4] H03C *3/00*
U.S. Cl. 332—18 **17 Claims**



1. A device for generating a frequency-modulation signal according to a predetermined law, comprising in series:

a digital generator that, from a clock signal of period $T = 1/F_H$ (where F_H is the frequency of the clock signal)

and an external control signal (S_d), delivers on the one hand an output signal s(t) of which each alternance presents a variable duration (N_0T, N_1T, . . . , N_kT, N_nT) that is an integer multiple of the clock period, and, on the other hand, an error signal (S_e) representing modulation errors of said output signal with respect to a theoretical output signal (S_t) modulated according to the predetermined law; and

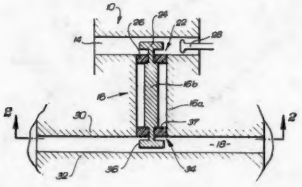
error correction means supplied with said output signal and controlled by said error signal (Se) for correcting said modulation errors and providing a corrected signal.

4,590,446

RADIAL WAVEGUIDE POWER DIVIDER/COMBINER

Ting-Ih Hsu, and Mario D. Simonutti, both of Manhattan Beach, Calif., assignors to TRW Inc., Redondo Beach, Calif.

Filed Jun. 28, 1984, Ser. No. 625,875
Int. Cl.[4] H01P *5/12*
U.S. Cl. 333—125 **10 Claims**



1. A non-resonant N-way power divider/combiner network having a large bandwidth, comprising:

a rectangular waveguide serving as an input/output port;

a first waveguide transition, from rectangular to circularly symmetrical;

a circularly symmetrical waveguide section of the coaxial type coupled to the first waveguide transition;

a second waveguide transition, from circularly symmetrical to radial;

a radial waveguide coupled to the second waveguide transition;

a plurality (N) of waveguide transitions of a third type, from radial to rectangular; and

a plurality (N) of rectangular waveguides coupled to the waveguide transitions of the third type, to serve as N output/input ports.

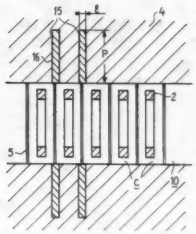
4,590,447

DELAY LINE OF THE CEILING AND RING TYPE OR OF THE CEILING AND BAR TYPE

Georges Fleury, Sevres, France, assignor to Thomson-CSF, Paris, France

Filed Aug. 8, 1983, Ser. No. 521,239
Claims priority, application France, Aug. 13, 1982, 82 14101
Int. Cl.[4] H01P *9/00;* H01J *23/30*
U.S. Cl. 333—156 **15 Claims**

1. In a delay line of the ceiling and ring type for a travelling wave tube formed by a succession of cells along the axis of the tube each cell being formed in the delay line of the ceiling and ring type by a ring supported by at least one foot, at least one ceiling and a waveguide portion, said lines being allowed to propagate several modes, a principal mode and several parasite modes, each mode having low and high cut-off wavelengths,



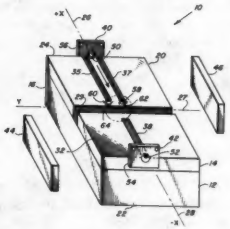
wherein resonating slits are provided disposed in the ceilings between two consecutive cells.

4,590,448

TUNABLE MICROWAVE FILTERS UTILIZING A SLOTTED LINE CIRCUIT

Carmine Vittoria, Newton, Mass., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.

Filed Sep. 25, 1985, Ser. No. 780,068
Int. Cl.[4] H01P *1/203, 1/215*
U.S. Cl. 333—205 **15 Claims**



1. A tunable slotline microwave filter comprising:

a base layer of low-loss insulating material;

a conductive magnetic material layer having a magnetic susceptibility value high enough to be classified as ferromagnetic disposed on the base layer, said conductive layer having first, second, third and fourth sides, a top surface, a positive x axis and a parallel negative x axis intersecting at an origin and dividing the top surface into halfs, said x axes running parallel to said first and third sides, and a y axis perpendicular to said x axes and intersecting therewith at said origin;

a pattern of slots formed in said conductive magnetic material layer comprising a first set of slots and a second set of slots, with said first set of slots extending parallel to said negative x axis and only extending up to but not touching said y axis, with said second set of slots extending parallel to said positive x axis and only extending up to but not touching said y axis, and with said first and second sets of slots being symmetric about said x axes;

a dielectric junction formed at the origin of the negative and positive x axes;

first and second electrical connectors disposed opposite each other along the x axes of the conductive magnetic material layer; and

means for applying a variable dc magnetic field along the surface of the conductive magnetic material layer at different desired angles, said applying means being disposed

along the first and third sides of the conductive magnetic material layer to tune a resonant frequency.

4,590,449

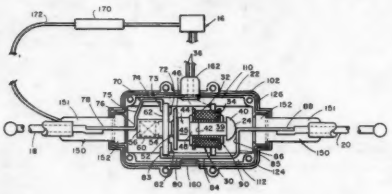
SOLENOID SWITCH

Willem R. VanTielen, 8891 Luce St., Oden, Mich. 49764

Filed Aug. 13, 1984, Ser. No. 639,704

Int. Cl.[4] H01H *67/02*

U.S. Cl. 335—126 **30 Claims**



1. A solenoid switch assembly comprising:

a solenoid switch having a coil and a moving core, said core moving along an axis and being provided with an electrically conductive contact bridge movable with said core between an open position and a closed position;

a first contact having a first contact end positioned to be engaged by said contact bridge in said closed position and having a first connection end extending generally along said axis on a first side of said solenoid switch; and

a second contact having a second contact end positioned to be engaged by said contact bridge in said closed position and having a second connection end extending generally along said axis on a second side of said solenoid switch opposite said first side, whereby said solenoid switch assembly is provided with a generally aligned configuration.

4,590,450

ELECTROMAGNETIC SWITCH APPARATUS

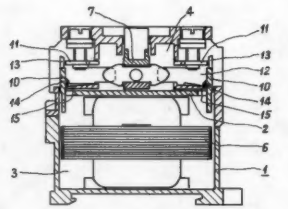
Alex Blum, Unterentfelden, Switzerland, assignor to Sprecher & Schuh AG, Aarau, Switzerland

Filed Nov. 15, 1984, Ser. No. 672,111

Claims priority, application Switzerland, Nov. 28, 1983, 6340/83

Int. Cl.[4] H01H *51/08*

U.S. Cl. 335—129 **4 Claims**



1. An electromagnetic switch apparatus including a two-partite casing and a partition wall inserted therein, which divides the casing into a switching magnet chamber and a connection contact chamber, and including a coupling lever arranged between a movable armature of the switching magnet in the switching magnet chamber and a contact bridge carrier in the switch- and connection contact chamber,

in which said partition wall comprises a plurality of at least twice stepped extensions projecting into the swtich- and connection contact chamber, the broader portions of the extensions located at a smaller distance from the partition wall covering the lower areas of the switch- and connection contact members inserted into the casing, and the upper narrower portions of the extensions projecting in front of the connection contact members and forming a protection against an accidental contact.

4,590,451

INTERLOCKING CONTACTOR ASSEMBLY

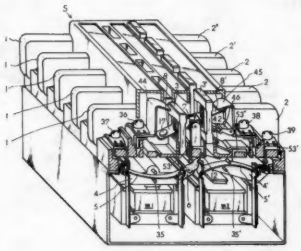
Motomu Miyamoto, Tokyo, Japan, assignor to SUN-S Company Ltd., Kanagawa, Japan

Continuation-in-part of Ser. No. 500,148, Jun. 1, 1983, Pat. No. 4,513,269. This application Mar. 14, 1985, Ser. No. 711,725

Claims priority, application Japan, Mar. 29, 1984, 59-61557

Int. Cl.[4] H01H *9/20*

U.S. Cl. 335—161 **7 Claims**



1. A contactor, comprising

(a) a case member provided with a plurality of pole chambers which are serially and vertically sectioned by diaphragms,

(b) a traveling contact member arranged in each of said pole chambers,

(c) a traveling contact of main contact made of a slide metal and being pivotally fixed to a pair of traveling contact bases and being integrated in a direction where mutual end portions of said pair of contact bases are engaged to cause seesaw movement by the interlocking movement thereof and being independently rotated in a direction where the mutual end portions are separated,

(d) stationary contacts of main contact disposed at an upper position on one side of each of said pole chambers, and at positions of an upper and lower portion on the other side of each of said pole chambers, metal contacts pivotally fixed to the contact base of the stationary contact of main contact of the upper portion on the other side to be energized and capable of freely contacting the stationary contact of main contact at the lower portion on the other side,

(e) a pair of right and left operation frames provided with a frame portion with a window having a pair of vertically disposed contact springs and a leg portion suspending and extending integrally from one side portion on the lower surface of the frame portion and being liftable at right and left of the traveling contact and allowing the traveling contact base to extend through the window and being sandwiched by said pair of vertically disposed contact springs, and

(f) a drive device for individually lifting said pair of right and left operation frames.

4,590,452

MAGNETIC DEVICE OF APPARATUS IN NUCLEAR SPIN TOMOGRAPHY WITH A SHIELDING DEVICE

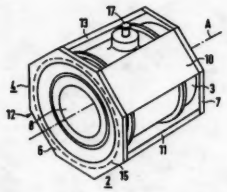
Günter Ries, and Horst Siebold, both of Erlangen, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany

Filed Aug. 14, 1984, Ser. No. 640,607

Claims priority, application Fed. Rep. of Germany, Sep. 19, 1983, 3333755

Int. Cl.[4] H01F *7/00*

U.S. Cl. 335—301 20 Claims



1. In a magnetic device of a system for use in nuclear spin tomography comprising: several magnet coils which surround an interior suitable for receiving a body to be examined and generate therein an at least largely homogeneous magnetic field; and a cylindrical shielding device which consists of ferromagnetic material, surrounds the coils and includes a part with, at least largely, the shape of a cylinder, and, at its end faces, washer-like parts with central openings with a predetermined radius with respect to the cylinder axis, the improvement comprising: the approximately cylindrical part of the shielding device being made up of at least four beam-like shielding elements of at least identical design uniformly distributed over a common cylinder surface.

4,590,453

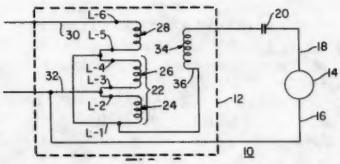
AUTOTRANSFORMER WITH COMMON WINDING HAVING OPPOSITELY WOUND SECTIONS

Adrian M. Weissman, West Orange, N.J., assignor to Universal Manufacturing Corporation, Paterson, N.J.

Filed Jun. 23, 1983, Ser. No. 507,163

Int. Cl.[4] H01F *27/28*

U.S. Cl. 336—180 9 Claims



1. In a transformer, a magnetic circuit assembly comprising a common winding having at least first and second sections and being formed from an electrical conductor, each of the first and second sections having first and second conductor ends, the first section being wound in one winding direction from its first conductor end to its second conductor end, the second conductor end of the first section being electrically connected to the first conductor end of the second section, the first conductor end of the first section being electrically connected to the second conductor end of the second section, the second section being wound from its first conductor end to its second conductor end in a winding direction opposite to that of the first section and being disposed in overlying relationship to the first section, wherein the first and second sections of the common winding are magnetically coupled to reinforce the magnetic field of each and electrically connected in parallel so that each section shares the current load of the common winding.

4,590,454

CONTROL ASSEMBLY

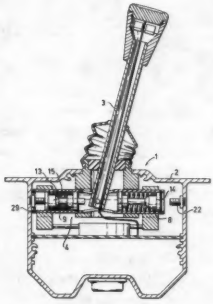
Ted Zettergren, Nyland, Sweden, assignor to Hydrino AB, Nyland, Sweden

Filed Sep. 28, 1984, Ser. No. 655,558

Claims priority, application Sweden, Oct. 5, 1983, 8305489

Int. Cl.[4] H01C *10/16*

U.S. Cl. 338—128 6 Claims



1. A control assembly comprising, a housing, a control lever extending from the housing and pivotally mounted therein, spring means arranged in said housing to return the control lever automatically to a neutral position, a potentiometer for converting movement of said control lever relative to the housing from said neutral position to an electrical signal, said spring means including two mutually connected tubular parts and a respective coil spring positioned in each tubular part, an end of said control lever being pivotally mounted in the housing between said coil springs, said springs acting in opposite directions relative to the lever, the longitudinal axes of the respective tubular parts extenting substantially at right angles to the longitudinal axis of said lever when the lever is in said neutral position, each of the tubular parts being axially movable relative to the housing against the action of said coil springs, an axially movable piston mounted in each tubular part, said coil springs being located between respective pistons and the ends of the respective tubular parts located adjacent the attachment point of said end of the control lever, respective studs mounted on the housing, each stud extending toward a respective free surface of the pistons such that each stud abuts against its respective piston when the lever is in said neutral position, said potentiometer having a first part connected to said tubular parts and extending parallel to an axial extension thereof, and a second part secured to the housing.

4,590,455

TRAFFIC CONTROL SYSTEM USING TIMED BLINK SIGNAL AND ROAD MARKER

George H. Fritzinger, 15 Standish Ave., West Orange, N.J. 07052

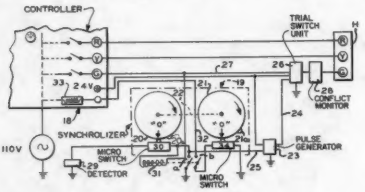
Continuation-in-part of Ser. No. 87,583, Oct. 22, 1979, Pat. No. 4,371,863, which is a continuation-in-part of Ser. No. 905,350, May 12, 1978, Pat. No. 4,200,860, which is a continuation-in-part of Ser. No. 681,539, Apr. 29, 1976, abandoned. This application Jul. 3, 1980, Ser. No. 165,746

Int. Cl.[4] G08G *1/096, 1/095*

U.S. Cl. 340—907 7 Claims

1. In a traffic control system comprising red, green and yellow signal lights for each direction of traffic at an intersection wherein said lights are controlled to cause only one of said lights to be "on" at any one time in any one direction, and the lights in each direction are shifted at intervals to red and green

to indicate changes in the direction of traffic: the combination of a controller with means to provide a short momentary blink of said green and/or red signal lights at a predetermined interval before each change in direction of traffic at said intersection with continuation of the light in a steady condition after the blink; and a marker on a roadway to said intersection



placed at a distance from the intersection equal approximately to the normal distance of travel on the roadway within the timing of said blink signal whereby to enable the motorist to interpret said blink signal solely by his location relative to the marker when the blink signal occurs to achieve greater safety and to save gasoline.

4,590,456

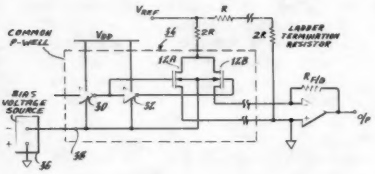
LOW LEAKAGE CMOS D/A CONVERTER

David P. Burton, and Peter Real, both of Limerick, Ireland, assignors to Analog Devices, Incorporated, Norwood, Mass.

Continuation of Ser. No. 684,453, Dec. 21, 1984, abandoned, which is a continuation of Ser. No. 414,317, Sep. 2, 1982, abandoned. This application Aug. 6, 1985, Ser. No. 762,967

Int. Cl.[4] H03K *17/687*

U.S. Cl. 340—347 DA **15 Claims**



1. In a CMOS digital-to-analog converter comprising at least one switch-pair in a common well, the individual switches of such pair being complementarily driven to "on" and "off" condition respectively to switch a corresponding resistance network terminal to one or the other of a pair of output lines in accordance with the state of an input bit, each switch having a driving gate and a back gate;

that improvement in such a converter for reducing leakage current comprising:

bias means to develop a predetermined potential difference between said output lines and said well with said well being more negative than said output lines, thereby to avoid bipolar leakage current.

4,590,457

DIGITAL TO ANALOG CONVERTER UTILIZING PULSE WIDTH MODULATION

Gideon Amir, San Jose, Calif., assignor to American Microsystems, Inc., Santa Clara, Calif.

Filed Dec. 20, 1983, Ser. No. 563,720

Int. Cl.[4] H03K *13/04*

U.S. Cl. 340—347 DA **18 Claims**

1. A digital-to-analog converter comprising:

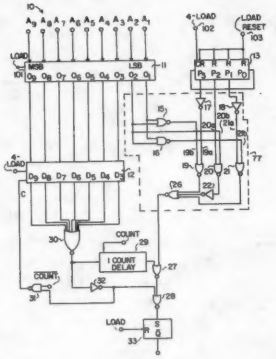
N input terminals for receiving respective bits of an N bit digital word made up of K least significant bits and N−K most significant bits, and representing a sample of an analog signal to be generated;

a source of a sample clock signal at frequency f_s and having period P;

input memory means responsive to the sample clock signal to store the values at the N input terminals as a first digital word;

a source of a reload clock signal at frequency $f_r=(2^K)f_s$ and synchronized with the sample clock signal;

a source of a count clock at frequency $f_c=(2^N)f_s$ and synchronized with the sample clock;



a down counter responsive to the reload clock signal to copy the N−K most significant bit values from the input memory as a second digital word and responsive to the count clock signal to decrement the second digital word by ones to zero, and having N−K output terminals at which the second digital word values are output; and

means for producing an output signal having a first level while the second digital word is positive and continuing to have the first level during one period of the count clock after the second word is decremented to zero in each of J periods of the reload clock per period of the sample clock, where J is the value of the K least significant bits, and otherwise having a second level.

4,590,458

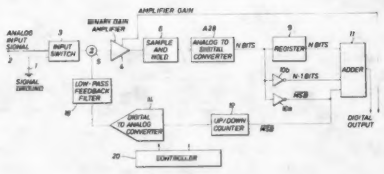
OFFSET REMOVAL IN AN ANALOG TO DIGITAL CONVERSION SYSTEM

John T. Evans, Houston, and Richard J. Kostelnicek, Dickinson, both of Tex., assignors to Exxon Production Research Co., Houston, Tex.

Filed Mar. 4, 1985, Ser. No. 707,763

Int. Cl.[4] H03K *13/02;* **H03F** *3/45*

U.S. Cl. 340—347 AD **11 Claims**



1. A method of reducing offset error in a conversion system for generating an output digital signal representative of an analog signal applied to the input of said system comprising:

storing in a register a first digital signal representative of the offset in the system;

generating a feedback analog signal having an amplitude related to the first digital signal;

combining said feedback analog signal with the analog signal applied to the system input to reduce the offset present in the output digital signal;

applying signal ground to the system input and operating the system to generate a digital signal representative of remaining system offset; and

varying said first digital signal in response to said digital signal representative of remaining system offset to further reduce system offset.

4,590,459

ANALOG/DIGITAL CONVERTER

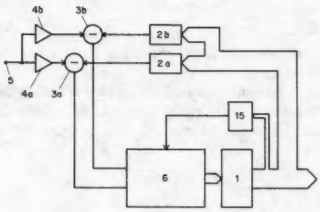
Otto Lanz, Niederrohrdorf; Martin Maschek, Würenlos, and Georg Mastner, Niederrohrdorf, all of Switzerland, assignors to BBC Brown, Boveri & Company, Ltd., Baden, Switzerland

Filed May 14, 1985, Ser. No. 733,878

Claims priority, application Switzerland, May 15, 1984, 2378/84

Int. Cl.⁴ H03M *1/00*

U.S. Cl. 340—347 AD **2 Claims**



1. Analog/digital converter comprising a digital integrator (**1**), a first digital/analog converter (*2a*) which is supplied from the output of the digital integrator (**1**), in each case together with a polarity bit (B_{16}), with a group of amount bits, immediately succeeding each other with respect to their significances, which group includes the least significant amount bit, a first subtracter (*3a*) which forms the difference between a signal proportional to the input signal of the analog/digital converter and the output signal of the first digital/analog converter (*2a*) and a tracking circuit (**6**) which is supplied with the output signal of the first subtracter (*3a*) and generates the tracking signals for the digital integrator (**1**), controlled by the output signal of the first subtracter (*3a*) for at least as long as the number formed by the group of amount bits supplied to the first digital analog converter (*2a*) lies below an upper switching limit (U+), characterised in that the analog/digital converter

contains at least one further digital/analog converter (*2b*) which is supplied from the output of the integrator (**1**), in each case simultaneously with the polarity bit, with a group of amount bits which immediately succeeded each other with respect to their significances,

contains for each further digital/analog converter one further subtracter (*3b*) which forms the difference between a signal proportional to the input signal of the analog/digital converter and the output signal of the further digital-/analog converter (*2b*), in which arrangement

the lower limit and the upper limit of the significances of the amount bits fed to a further digital/analog converter (*2b*) are in each case greater than the lower limit or the upper limit of the significances of the amount bits fed to the preceding digital/analog converter (*2a*),

the lower limit of the significances of the amount bits fed to a further digital/analog converter (*2b*) lies in each case below the upper limit of the significances of the amount bits fed to the preceding digital/analog converter (*2a*),

the signal fed to a further subtracter (*3b*) and proportional to the input signal of the analog/digital converter differs from the signal fed to the first subtracter (*3a*) and proportional to the input signal by a scaling factor of 2^{-n+1}, n being in each case equal to the lower limit of the significances of the amount bits fed to the corresponding further digital/analog converter (*2b*),

that furthermore, a control logic (**15**) is provided which controls the tracking circuit (**6**) as a function of the output signal of the digital integrator (**1**) in such a manner that

when the amount of the number represented by the group of the bits fed to one of the digital/analog converters *2a*) reaches an upper switching limit (U+), if necessary a tracking signal generated on the basis of the output signal of the respective further subtracter (*3b*) is next fed to the integrator (**1**),

when the amount of the number represented by the group of the bits fed to one of the further digital/analog converters (*2b*) reaches a lower switching limit, a tracking signal generated on the basis of the output signal of the respectively preceding subtracter (*3a*) is next fed to the integrator (**1**),

in which arrangement

a tracking step induced on the basis of the output signal of one of the further subtracters (*3b*) differs by the inverse of the respective scaling factor, that is to say by 2^{n-1}, from a tracking step induced on the basis of an equally large output signal of the first subtracter (*3a*).

4,590,460

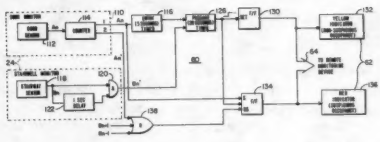
STAIRWELL SECURITY SYSTEM

Ralph E. Abbott, 26 Fort Pond Rd., Acton, Mass. 01720, and Ronald J. Massa, 16 Beverly Rd., Bedford, Mass. 01730

Filed Oct. 3, 1984, Ser. No. 657,161

Int. Cl.⁴ G08B *13/08, 13/18*

U.S. Cl. 340—541 **26 Claims**



1. A stairwell security system comprising:

a door monitoring sensor for detecting movement through a stairwell door;

a first stairway monitoring sensor for detecting occupancy in the stairwell proximate the door;

a second stairway monitoring sensor for detecting occupancy in the stairwell proximate the next higher door;

a third stairway monitoring sensor for detecting occupancy in the stairwell proximate the next lower door;

timing means for measuring a first time period in response to activation of said door sensor and for measuring a second time period in response to activation of said first stairway sensor during said first time period; and

alarm means for indicating a suspicious occupancy at the expiration of said second time period in the absence of detection of occupancy by one of said second and third stairway monitoring sensors.

4,590,461

TAMPER RESISTANT TARGET WAFER AND FASTENER ASSEMBLY

Michael N. Cooper, Flushing, N.Y., assignor to Knogo Corporation, Hicksville, N.Y.

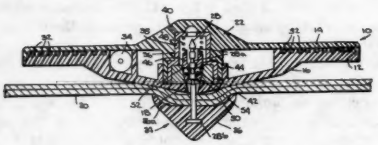
Filed Oct. 5, 1984, Ser. No. 658,392

Int. Cl.⁴ G08B *13/18;* A44B *9/00*

U.S. Cl. 340—572 **9 Claims**

1. A target wafer for use in an electronic theft detection system, said target wafer comprising a disc shaped outer hous-

ing containing an embedded electrical circuit and a fastener element locking mechanism of the type which grips the elongated shank of a tack-like fastener element, said housing being formed with a bulge on each side thereof, said bulges being



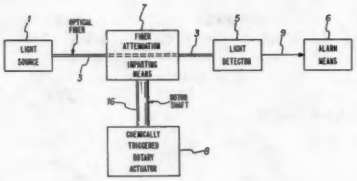
mutually aligned and of substantially the same height and the total height of said bulges being sufficient to enclose said locking mechanism oriented to hold a fastener element shank substantially perpendicular to the plane of said housing.

4,590,462

OIL LEAKAGE DETECTION APPARATUS

Robert M. Moorehead, Richardson, Tex., assignor to Glen C. Amon and Horace T. Ardinger, Jr., both of Dallas, Tex.

Filed Jan. 28, 1985, Ser. No. 695,681
Int. Cl.[4] G08B *21/00*
U.S. Cl. 340—605 **13 Claims**



5. An alarm system for detecting presence of hydrocarbon substance comprising a rotary actuator mechanism including a rotatable shaft, said shaft having a longitudinally extending slot formed in the end extreme thereof, a fiber optic detector means with a light generator passing light through a fiber optic cable to a light detector, said detector being responsive to attenuation in said cable to cause an alarm to be generated, said cable being received in and extending through said rotor slot, and said rotary actuator comprising means response to exposure of said actuator to hydrocarbons to effect rotation of said actuator shaft from a predefined static position.

10. A rotary actuator mechanism comprising a cylindrical rotor member, a body member, means for rotatably mounting said rotor member with respect to said body member, means applying a compressive force to a radialy disposed point on said rotor member, said force acting through the rotational axis of said rotor, shear pin means passing through said rotor parallel to the rotational axis of said rotor and radially disposed with respect to the rotational axis of said rotor, said shear pin means having end extremes extending from said rotor and received in said body member to constrain rotation of said rotor with respect to said body member, said shear pin means comprising a substance soluable in hydrocarbons.

4,590,463

DIGITAL CONTROL OF COLOR IN CRT DISPLAY

Charles F. Smollin, Indianapolis, Ind., assignor to RCA Corporation, Princeton, N.J.

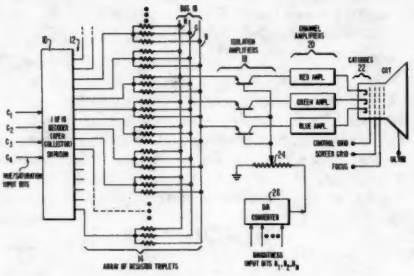
Filed Sep. 29, 1980, Ser. No. 191,909
Int. Cl.[4] G09G *1/16, 1/28*
U.S. Cl. 340—703 **8 Claims**

1. In a display including a cathode-ray-tube having red, green and blue signal input channels, means responsive to n bits of a hue/saturation digital input signal to control the color produced on the face of the cathode-ray-tube, comprising in combination,

a decoder receptive to said n input bits and operative to select one of m output lines, where m is an integer greater than one and no greater than 2^n,

an array of m red, green and blue resistor triplets, all resistors of a triplet having one common connection to a respective one of said m decoder output lines, and the other ends of all red, green and blue resistors being connected to respective red, green and blue buses, and

red, green and blue channels including isolation amplifiers coupling respective red, green and blue buses to respective red, green and blue signal inputs of said cathode-ray-tube.

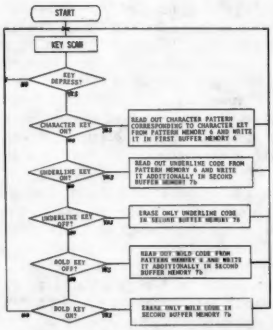


4,590,464

DISPLAY APPARATUS USING DOT MATRIXES

Mamoru Imaizumi, and Kiyoshi Shibata, both of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan

Filed Apr. 18, 1983, Ser. No. 486,069
Claims priority, application Japan, Apr. 22, 1982, 57-59981[U]
Int. Cl.[4] G09G *1/16*
U.S. Cl. 340—711 **1 Claim**


START
KEY SCAN
KEY DEPRESS?
CHARACTER KEY OUT?
UNDERLINE KEY OUT?
UNDERLINE KEY OUT?
BOLD KEY OUT?
BOLD KEY OUT?
READ OUT CHARACTER PATTERN CORRESPONDING TO CHARACTER KEY FROM PATTERN MEMORY A AND WRITE IT IN FIRST BUFFER MEMORY A
READ OUT UNDERLINE CODE FROM PATTERN MEMORY A AND WRITE IT ADDITIONALLY IN SECOND BUFFER MEMORY Tb
ERASE ONLY UNDERLINE CODE IN SECOND BUFFER MEMORY Tb
READ OUT BOLD CODE FROM PATTERN MEMORY A AND WRITE IT ADDITIONALLY IN SECOND BUFFER MEMORY Tb
ERASE ONLY BOLD CODE IN SECOND BUFFER MEMORY Tb

1. A keyboard type display apparatus using dot matrixes, comprising

a keyboard equipped with character keys and special symbol set keys for modifying characters;

a pattern memory storing therein character pattern data and special symbol pattern data corresponding to said character keys and special symbol set keys;

a buffer memory for storing the character pattern data and the special symbol pattern data read out from said pattern memory;

a low resolution display device for displaying characters and

special symbols by use of said dot matrixes in accordance with the character pattern data and the special symbol pattern data in said buffer memory;

first control means responsive to said character keys and said special symbol keys for accessing said pattern memory and for writing in said buffer memory the character pattern data and the special pattern data read out from the pattern memory; and

second control means responsive to depression of said character keys and said special symbol keys for scanning the character pattern data and the special symbol pattern data written in said buffer memory and for producing repeated blinking display of the characters corresponding to the depressed character keys alternately with the special symbols corresponding to the depressed special symbol keys at the same position on said display device;

wherein said buffer memory comprises a first buffer memory for storing the character pattern data read out from said pattern memory, and a second buffer memory for storing the special symbol pattern data read out from said pattern memory;

wherein said display device displays the characters and special symbols using said dot matrixes in accordance with the character pattern data and the special symbol pattern data in said first buffer memory and in the said second buffer memory, respectively;

wherein said first control means writes in said first buffer memory the character pattern data read out from said pattern memory in accordance with the code inputted by the character key on said keyboard and further writes in said second buffer memory the special symbol pattern data read out from said pattern memory in accordance with the code inputted by said special symbol key on said keyboard;

wherein said second control means first scans the character pattern data written in said first buffer memory and displays only the corresponding character on said display device for a predetermined time period t_1;

wherein said second control means second after said time period t_1 scans the special symbol pattern data written in said second buffer memory and displays the corresponding special symbol on said display only device for a predetermined period t_2, wherein said period t_1 is greater than period t_2;

wherein said second control means then repeats said first scan and said second scan thereby to produce repeated blinking display of only the special signal alternately with only the character at the same position on said display device; and

wherein said second control means in response to a subsequent depression of said special symbol key terminates the repeated alternate blinking display of said character and said special symbol on said display device.

4,590,465

GRAPHICS DISPLAY SYSTEM USING LOGIC-ENHANCED PIXEL MEMORY CELLS

Henry Fuchs, Computer Science Dept. (035A), U.N.C., Chapel Hill, N.C. 27514

Filed Feb. 18, 1982, Ser. No. 349,818
Int. Cl.[4] G09G *1/00*
U.S. Cl. 340—723 **54 Claims**

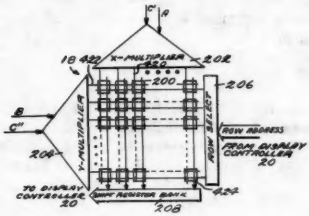
1. A graphics display system comprising:

a display device including a plurality of individual picture elements (pixels), each said pixel being disposed at a predetermined position in a nominal display coordinate system;

processor means, responsive to data base signals representative of at least a portion of a visual three dimensional scene and perspective control signals applied thereto, for generating display coordinate data signals representative of said scene portion viewed from a perspective defined by said perspective control signals, said scene including at least one object, said display coordinate data signals comprising sequential representations of the spatial disposition and luminescent intensity of a plurality of component surfaces of said object in said scene portion;

preprocessor means, responsive to said display coordinate data signals, for selectively generating, in respect of each of said plurality of sequential component surfaces, respective coefficient signals indicative of coefficients of at least one equation representative of respective aspects of said each component surface;

image buffer means, responsive to said coefficient signals and including a respective individual cell corresponding



to each said display device pixel, for determining, at each cell, the value of said equation in parallel at the positions of each said pixel, and selectively storing indicia of intensity values in each cell corresponding to a pixel within the component surface, which pixel is not obstructed from said perspective by any preceding sequential component surface; and

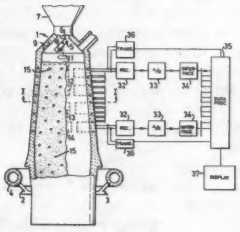
display control means, responsive to said stored intensity indicia, for controlling said display pixels in accordance with the intensity indicia stored in said image buffer means corresponding individual cell.

4,590,466

METHOD AND APPARATUS FOR SAMPLING MEASUREMENT DATA FROM A CHEMICAL PROCESS

Klas R. Wiklund, and Erik I. Johansson, both of Täby, Sweden, assignors to Pharos AB, Lidingö , Sweden

Filed Jun. 20, 1983, Ser. No. 505,996
Claims priority, application Sweden, Jun. 28, 1982, 8203983
Int. Cl.[4] G08C *17/00*
U.S. Cl. 340—870.28 **17 Claims**



1. In a method of obtaining measurement data from a process which comprises introducing a mass into a confined space, subjecting the mass in the confined space to chemical or mechanical change, and obtaining measurement data from the mass while it is subject to said change in said confined space, the improvement wherein said measurement data is obtained by:

providing a plurality of individual, unconnected, sensors in said mass in said confined space, each sensor comprising at least one sensing means for sensing a property of said mass, an acoustic or electromagnetic wireless transmitter

connected to said sensing means for transmitting a signal representative of a sensed property of said mass;

providing a plurality of discrete wireless signal receiving means over the surface defining said confined space for receiving signals from said transmitter;

determining, from a property of a signal received by each of said plurality of signal receiving means, the position in said confined space of each of said sensors;

determining, from said signal received by each of said plurality of signal receiving means, said sensed property of said mass; and

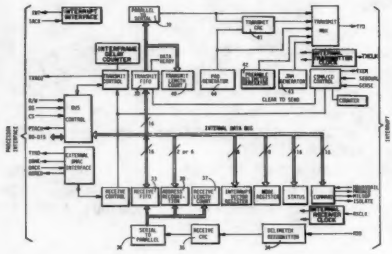
displaying for each of said sensors, an indication of its location in said mass and a property of said mass sensed at that location.

4,590,467

LOCAL AREA NETWORK INTERFACE CONTROLLER

Lawrence E. Lare, Cardiff-By-The-Sea, Calif., assignor to Rockwell International Corporation, El Segundo, Calif.

Filed Oct. 13, 1983, Ser. No. 541,817
Int. Cl.[4] H04Q *9/00*
U.S. Cl. 340—825.5 **3 Claims**



1. In data communications network having a plurality of information processing systems coupled to a communication channel which serially transmits data in the form of information packets at a first clock rate, a network controller disposed between said communication channel and an information processing system including a system data bus having associated therewith a second clock rate, comprising:

an interface unit connected to said communication channel for transferring data in the form of information packets to and from said channel;

a de-serializer connected to said interface unit for converting data in said information packet received from said channel from serial form to parallel form;

a receiver buffer connected to said de-serializer for storing in parallel form the data corresponding to a plurality of information packets transferred from said communication channel;

a first shift register having n bit positions including a first pointer bit, and circulating at a first clock rate corresponding to the clock rate of data on said communication channel, where n corresponds to the number of memory locations in said receive buffer, the location of said pointer bit with respect to said n bit positions in said first shift register corresponding to and pointing to the memory location in said receiver buffer wherein said data from said de-serializer is to transmit the data into said receive buffer; and

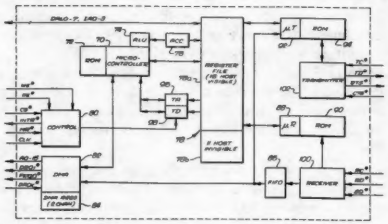
a second shift register having n positions, including a second pointer bit, and circulating at said second clock rate corresponding to the clock rate of said system bus, the location of said second pointer bit with respect to said n bit positions corresponding to and pointing to the memory location in said receive buffer wherein data stored in said receive buffer is to be transferred to said system bus during the next memory cycle of said system bus.

4,590,468

TOKEN ACCESS CONTROLLER PROTOCOL AND ARCHITECTURE

Mark Stieglitz, Irvine, Calif., assignor to Western Digital Corporation, Irvine, Calif.

Filed Mar. 10, 1983, Ser. No. 474,135
Int. Cl.[4] H04Q *9/00*; **G06F** *13/00, 15/16*
U.S. Cl. 340—825.5 **24 Claims**



1. A token access controller for controlling the transmission of information fields over a network comprising a plurality of nodes connected by a transmission medium for transmitting frames, wherein each node has been assigned an unique network address and each node has a token access controller, host processor, memory, and internal bus and interface means to connect said internal bus to said transmission medium, said token access controller comprising:

means for passing the right to transmit any information field between nodes, wherein the node that has the right to transmit any information field is the only node that is enabled to transmit on the transmission medium of the network and all other nodes can only be enabled to receive the transmitted frames;

means for determining when said token access controller has finished transmitting;

means for determining the successor node, wherein the successor node is the node that said token access controller shall pass the token to when said node finishes transmitting and the successor node is unique;

means for the host processor of the node of said token access controller to instruct said token access controller where information to be transmitted is stored in the memory of the node of said token access controller;

means for transmitting information stored in the memory of the node of said token access controller to another node without the aid of the host processor of the node of said token access controller once said host processor instructs said token access controller of the location of the information in its memory;

means for the host processor of the node of said token access controller to instruct said token access controller where information to be received from another node should be stored in the memory of the node of said token access controller; and

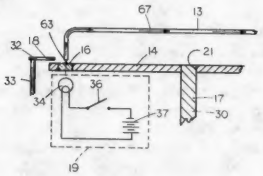
means for receiving information from another node and storing the information in the memory of the node of said token access controller without the aid of the host processor of the node of said token access controller once said host processor instructs the token access controller where the information should be stored.

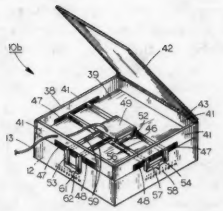
4,590,469

COLOR BASED DATA ENCODING AND STORAGE APPARATUS

James Seals, Rte. 1, Woodward, Iowa 50276

Filed Aug. 27, 1984, Ser. No. 644,413
Int. Cl.[4] A03M *1/00*
U.S. Cl. 340—347 P **1 Claim**





1. A color based data encoding and storage apparatus comprising:

(a) encoding means for receiving data and converting said data to color encoded data, including:

(i) a plurality of colored lenses, such that a discrete color and lens is provided for each discrete quantum of input data;

(ii) a lens supporting member for supporting said plurality of colored lenses;

(iii) lens selection means for allowing a preselected colored lens to be selected upon input of a desired quantum of input data; and

(iv) light source means for selectively passing a beam of light through said selected colored lens;

(b) storage means for receiving and storing said color encoded data, including;

(i) a light shielded container for receiving color film;

(ii) a color encoded data placement unit for movable disposition above said color film;

(iii) X axis positioning means for allowing the position of said color encoded data placement unit to be moved in said X axis with respect to said color film; and

(iv) Y axis positioning means for allowing the position of said color encoded data placement unit to be moved in said Y axis with respect to said color film; and

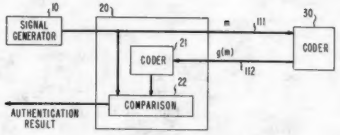
(c) color encoded data transmission means for transmitting color encoded data from said encoding means to said storage means, comprising at least one optical fiber having a first end positioned to receive color coded data from said encoding means and a second end operably connected to said color encoded data placement unit for allowing said color film to be selectively exposed to said color encoded data.

4,590,470

USER AUTHENTICATION SYSTEM EMPLOYING ENCRYPTION FUNCTIONS

Andrew R. Koenig, Elizabeth, N.J., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jul. 11, 1983, Ser. No. 512,887
Int. Cl.[4] H04Q *9/00;* **H04L** *9/00;* **G06K** *5/00*
U.S. Cl. 340—825.31 **5 Claims**



1. A communication system employing a two-way communication link (**111** and **112**), first means (**10** and **20**) connected to said link for initiating an authentication protocol and second means (**30**) connected to said link for responding to initiated authentication protocol, characterized in that:

said communication system employs a public key encryption approach characterized by a pair of encryption functions, one being a public key and the other being a private key; and

said first means comprises: a generator (**10**) for initiating a protocol by developing an essentially random authentication message, third means for sending a challenge signal over said link to said second means, and fourth means for comparing said authentication message with a response signal sent by said second means.

4,590,471

ELECTROLUMINESCENT (EL) REMOTELY-CONTROLLED LANDING ZONE MARKER LIGHT SYSTEM

Chesley S. Pieroway, Xenia; Alonzo Blount, Trotwood; George L. Britton, Yellow Springs, and David J. Krile, Dayton, all of Ohio, assignors to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Dec. 28, 1983, Ser. No. 566,351
Int. Cl.[4] G08G *5/00;* **G08C** *19/00*
U.S. Cl. 340—825.69 **2 Claims**

1. Remotely controlled lighting apparatus, comprising:

(a) a plurality of light units, each of which includes a pair of side-by-side electroluminescent light panels;

(b) electrical signal receiving means electrically connected to said light units; and

(c) electrical signal transmitting means, said transmitting means and said receiving means capable of being preset to respectively transmit and receive a first electrical signal for turning on said light units and a second electrical signal different from said first electrical signal for turning off said light units, wherein said first and second electrical signals are each a different sequence of coded pulses;

wherein said electrical signal transmitting means includes a transmitter separate physically from said remote controllers and light units, said transmitter being adapted to communicate electrically with each said receiver;

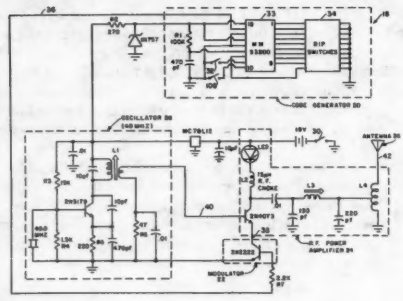
wherein said transmitting means includes a code generator, a modulator, an oscillator, an R.F. power amplifier having an input coupled to said oscillator and an output coupled to a transmitting antenna;

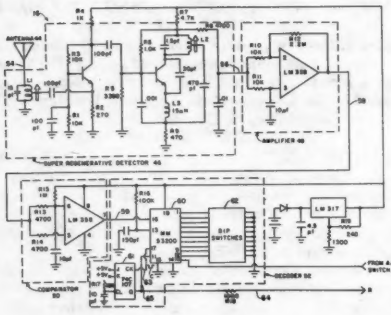
wherein the code generator comprises a code/decode module having a plurality of terminals, a module of preset dip switches connected to some of the terminals of the code/-decode module for presetting the sequence of coded pulses for the first and second electrical signals, a code select switch connected to a terminal of the code/decode module and actuatable between a first position for selecting said first electrical signal and a second position for

selecting said second electrical signal, a transmit A/B select switch connected to a terminal of the code/decode module and actuatable between two positions for selecting either a first set or a second set of sequences of coded pulses for said first and second electrical signals, and resistance-capacitance means connected to terminals of the code/decode module;

wherein said modulator is a solid state device having an input terminal coupled to a terminal of the code/decode module, and an output terminal coupled to the R.F. amplifier, for coupling the coded output of the code/decode module to the R.F. power amplifier;

a power switch in series with a D.C. power supply coupled to the code/decode module, to the oscillator and to the R.F. power amplifier, the power switch being actuatable to a first position in which said transmitting means is caused to transmit one of said first and second signals according to the settings of the code select switch and the





A/B select switch, and a second inoperative position in which said transmitting means is shut off, whereby said transmitting means is operable to repeatably transmit one of said first and second electrical signals without transmitting the other of said signals between said one signals;

wherein said electrical signal receiving means comprises at least one remote controller which includes a receiver and control means, the receiver having a control output coupled to the control means for supplying an "on" or an "off" signal to the control means, and the control means having relay means actuable in response to the "on" signal to connect a source of a.c. power to turn the light units on, and actuable in response to the "off" signal to disconnect the source of a.c. power to turn the light units off;

said receiver having a receiving antenna, a super regenerative detector coupled to the receiving antenna, a comparator, an amplifier coupled between the super regenerative detector and the comparator, and a decoder coupled to an output of the comparator, so that signals from the transmitting antenna are received by the receiving antenna, detected by the super regenerative detector, amplified by the amplifier, and supplied to the comparator;

wherein the comparator compares signals from the amplifier and a fixed d.c. voltage level and outputs a pulse sequence to the decoder;

wherein the decoder comprises a code/decode module having a plurality of terminals which is the same as the code/-decode module of the transmitter, a flip-flop, and a module of dip switches connected to terminals of the code/-decode module and preset identical to the dip switches of the code generator of the transmitter, the flip-flop being a JK flip-flop having a clock input connected to an output terminal of the code/decode module and an output connected to an input terminal of the code/decode module, the flip-flop being actuatable between a first state in which said receiver is placed in a second condition for responding to said second electrical signal and not to said first electrical signal, and a second state in which said receiver is placed in a first condition for responding to said first electrical signal but not to said second electrical signal, the code/decode module of the receiver being operable for decoding said first and second electrical signals and outputting a first actuating signal to said flip-flop when said receiver is in its first condition which switches said flip-flop to its first state, while outputting a second actuating signal to said flip-flop when said receiver is in its second condition which switches said flip-flop to its second state, the output of the flip-flop being also connected to said control output, whereby each first or second electrical signal received immediately after a corresponding first one of said first or second electrical signals by said receiver does not correspondingly turn off or on said light units;

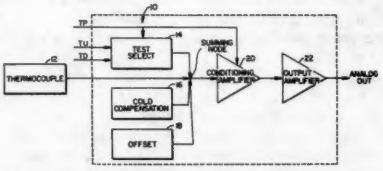
a receive A/B select switch connected to a terminal of the code/decode module of the receiver and actuatable between two positions for selecting either said first set or said second set of sequences of coded pulses for said first and second electrical signals.

4,590,472

ANALOG SIGNAL CONDITIONER FOR THERMAL COUPLED SIGNALS

Michael R. Benson, and William D. Hill, both of San Jose, Calif., assignors to General Electric Company, San Jose, Calif.

Filed Dec. 1, 1982, Ser. No. 446,004
Int. Cl.[4] G08C *19/22, 15/06*
U.S. Cl. 340—870.04 **6 Claims**



1. In a device for monitoring thermal conditions at selected locations in a nuclear power generation facility, an analog signal conditioner for low-level thermocouple generated signals, including a conditioning amplifier having a summing node input terminal for receiving said thermocouple signals and for producing an analog output signal corresponding thereto, contour means coupled to said summing node input terminal for shaping characteristic response of said amplifier to said thermocouple signals, and a signal conditioner test circuit, comprising:

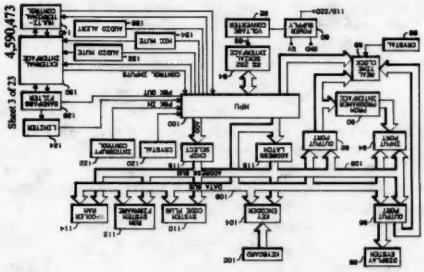
first switch means, coupled to said conditioning amplifier,

for setting conditioning amplifier sensitivity to a preselected level in response to a short duration test pulse; and second switch means, coupled to said conditioning amplifier summing node input terminal, for supplying a test signal to said conditioning amplifier in response to said test pulse.

4,590,473
DATA SIGNALLING SYSTEM

Timothy M. Burke, Fort Worth; Scott W. Noble, Bedford, both of Tex.; Thomas A. Freeburg, Arlington Heights, and Jay R. Krebs, Crystal Lake, both of Ill., assignors to Motorola, Inc., Schaumberg, Ill.

Filed Jul. 28, 1982, Ser. No. 402,682
Int. Cl.[4] H04Q *9/00*; H04B *7/00*
U.S. Cl. 340—825.52 **9 Claims**



1. In a register modelled system of wireless communication, wherein individual communication units are viewed as registers, a method for communicating between communication units comprising the steps of:

receiving said wireless communication, further comprising a modulated command packet having at least an operation code and an argument that may comprise the destination of an addressable register;

demodulating said wireless communication to extract said command packet from said communication;

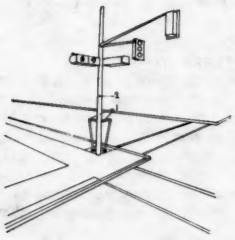
parsing said command packet to extract said operation code and said argument; and

performing said operation upon any remaining portions of said communication in cooperation with said argument.

4,590,474
STREET CROSSING SIGNAL DEVICE FOR BLIND PERSONS

David G. Patterson, R.R. #6, Smiths Falls, Ontario, and Albert W. Patterson, R.R. #5, London, Ontario, both of Canada

Filed Mar. 18, 1983, Ser. No. 476,490
Claims priority, application Canada, Mar. 25, 1982, 399351
Int. Cl.[4] G08G *1/095*
U.S. Cl. 340—944 **5 Claims**



1. A device for use on a post such as is normally present at a corner of an intersection of two streets for signalling to blind persons that it is safe to cross one of the streets of the intersection at a selected pedestrian crosswalk, two such crosswalks originating from that corner, the device comprising:

(a) two rigid hand rails, each said hand rail being secured to the post and having at least a portion oriented towards an associated said crosswalk at said street intersection;

(b) an actuatable vibrator means secured within a portion of each said hand rail, said vibrator means, when actuated, causing its associated said hand rail to vibrate;

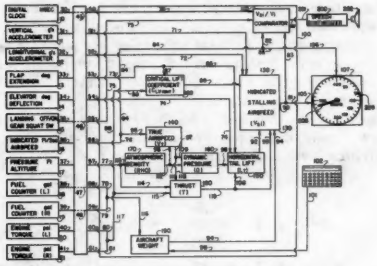
(c) mechanical means isolating each said hand rail from said post so that vibrations of each selected said hand rail are prevented from being transmitted to said post; and

(d) electronic circuit means associated with controls for pedestrian crossing lights at said street intersection and with associated said vibrator means, so that the vibrator means of the hand rail that has a portion oriented towards an associated said crosswalk is actuated when said pedestrian crossing lights permit crossing the street at that crosswalk.

4,590,475
STALL AVOIDANCE SYSTEM FOR AIRCRAFT

Jerry A. Brown, Hazelwood, Mo., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Oct. 24, 1983, Ser. No. 544,937
Int. Cl.[4] G08B *23/00*
U.S. Cl. 340—966 **6 Claims**



1. In the method for indicating the speed at which a specific aircraft in maneuvering flight is likely to stall wherein lift coefficients and load factors are used as stall determination parameters, the improvement wherein the effects of thrust are included in combination with instantaneous normal and longitudinal accelerations and tail lift changes in the stall determination for greater accuracy comprising:

observing actual stalling speeds and simultaneously sensed vertical and longitudinal accelerations, flap extension, elevator deflection, indicated airspeed, pressure altitude, and right and left engine torque parameters during flight testing, producing therefrom a mapping of effective critical lift coefficients (C_{Lvcrit}) as a function of flap extension and thrust by substituting the simultaneously sensed parameters in the equation

$$V_{SI} = \sqrt{\frac{2[W(\sin\alpha_w a_{xB} - \cos\alpha_w a_{zB}) - L_T - T\sin(\alpha_w + \xi_o)]}{C_{Lvcrit}\rho_o S_w}} \quad (1)$$

wherein

V_{SI} is the indicated stalling speed, ft/sec,

W is the weight of the aircraft, lbs,

α_w is the known stalling angle of attack, deg,

a_{xB} and a_{zB} are the accelerometer inputs, G's,

L_T is the lift produced by the horizontal tail, perpendicular to the velocity vector and in the plane of symmetry, lb,

T is powerplant thrust, assumed to lie in the plane of symmetry and oriented with respect to the body axes by the thrust inclination angle, lb,

$C_{L_{wcrit}}$ is the effective critical lift coefficient associated with the wing, dimensionless,

ρ_o refers to the sea-level-standard air density, slugs/ft,

ϵ_o is the thrust inclination angle with respect to the body axes and in the plane of symmetry, deg,

S_w is defined as the reference wing area, ft^2,

from the thus mapped effective critical lift coefficients along with measured aircraft wing flap extension, and aircraft powerplant torques, aircraft altitude and airspeed, expressed in binomial equation form, computing a real time effective critical lift coefficient, and providing an effective critical lift coefficient reference signal;

measuring the body-referenced acceleration about the vertical and longitudinal body axes, and providing reference signals indicative of said acceleration measurements;

measuring the wing flap position, elevator deflection, aircraft indicated altitude and airspeed, and powerplant thrust, and from said flap position, elevator deflection, altitude, airspeed and thrust measurements computing the horizontal tail lift for said aircraft, and providing a tail lift reference signal;

measuring the aircraft powerplant torques, the aircraft airspeed, the pressure altitude of said aircraft, and from said torques, airspeed and pressure altitude measurements computing the thrust, T, of said aircraft, and providing a reference signal indicative of said thrust;

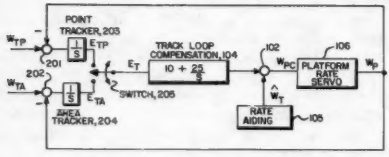
computing the instantaneous weight of said aircraft from the initial aircraft weight and the weight of the fuel expended during flight, and providing a reference signal indicative of said instantaneous aircraft weight; computing said aircraft stall speed using each of said reference signals and the equation (1); and

displaying said computed stall speed in units of aircraft speed on the instrument panel of said aircraft to provide a visual representation of said stall speed.

4,590,476
TRACKING SERVO COMPENSATOR WITH RATE AIDING

Bill E. Burkett, Longwood, Fla., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Aug. 15, 1984, Ser. No. 640,902
Int. Cl.[4] G01S *13/66*
U.S. Cl. 343—7.4 **17 Claims**



1. In combination with a radar system having a servomechanism steering an antenna by physically moving said antenna with a platform angular velocity, a radar receiver receiving radar data including target line-of-sight angular velocity for area track and point track, and a rate aiding estimate producing an estimated value of said target line-of-sight angular velocity, a tracking servo compensator comprising :

a first summing means receiving said platform angular velocity from said servomechanism and said target line-of-sight angular velocity from said radar receiver, said first summing means producing an output signal by subtracting said platform angular velocity from said target line-of-sight angular velocity;

a tracker model receiving said output signal from said first summing means and producing a tracking error signal;

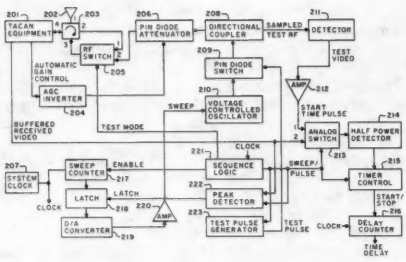
a track loop compensation means receiving said tracking error signal from said tracker model and producing a compensation signal compensating for said tracking error signal, said compensation signal having first and second signal components, said first signal component being proportional to said error signal, and said second signal component being proportional to the integral of said error signal;

a second summing means receiving and combining said estimated value of said target line-of-sight angular velocity from said rate aiding estimate with said compensation signal from said track loop compensation means, said second summing means providing a commanded platform angular velocity signal for said servomechanism, said commanded platform angular velocity signal causing said servomechanism to steer said antenna by physically moving said antenna with said platform angular velocity.

4,590,477
AUTOMATIC CALIBRATION SYSTEM FOR DISTANCE MEASUREMENT RECEIVERS

John A. Regnier, Lake Ronkonkoma, and Edward Savage, Dix Hills, both of N.Y., assignors to Eaton Corporation, Cleveland, Ohio

Filed Mar. 7, 1983, Ser. No. 473,094
Int. Cl.[4] G01S *7/40*
U.S. Cl. 343—17.7 **4 Claims**



1. Apparatus for measuring the pulse transmission time delay through a receiver having an RF input port and a video output port accessible to said apparatus and wherein the operating frequency range of the receiver is known, but the exact frequency within this operating frequency range to which the receiver is tuned (f_t) is not known, comprising:

(a) a variable frequency oscillator (VFO) having an operating frequency range which encompasses that of the receiver,

(b) sweeping means for generating and supplying a signal to the VFO to sweep the VFO through the operating frequency range of the receiver,

(c) means for coupling the output of the VFO to the RF input port of the receiver,

(d) sweep stop means for generating and supplying a sweep stop signal to the sweeping means to stop the sweep of the VFO at f_t in response to the receiver video output which occurs when the VFO has reached f_t during the sweep, said sweep stop means being connected to the receiver video output port to receive the video output signal from the receiver and also being connected to the sweeping means to supply the sweep stop signal to said sweeping means,

(e) pulse modulation means for modulating the output of the VFO to produce an RF pulse at the frequency f_t, said

pulse modulation means being connected in series between the output of the VFO and the RF input port of the receiver,

(f) pulse modulation control means for generating and supplying signals to the pulse modulation means to pass the VFO output without modulation during the sweep of the VFO and for pulse modulating the output of the VFO after the VFO has reached f_t to produce a single pulse at the frequency f_t, said pulse modulation control means being connected to the video output port of the receiver to receive the output signal when the VFO has reached f_t, and

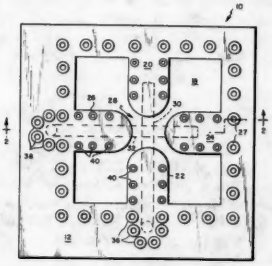
(g) pulse delay measurement means for measuring the time between the occurrence of like points on an input pulse entering the RF port of the receiver and an output pulse from the video output port of the receiver, said pulse delay measurement means being connected to the output of the pulse modulation means to receive a sample of the RF input pulse supplied to RF input port of the receiver and also connected to the video output port of the receiver to receive the output video pulse produced by said input RF pulse and said pulse delay measurement means supplying an output which is the measurement of the time delay between said input and output pulses.

4,590,478

MULTIPLE RIDGE ANTENNA

Richard L. Powers; Kenneth D. Arkind, and Richmond W. Price, all of Nashua, N.H., assignors to Sanders Associates, Inc., Nashua, N.H.

Filed Jun. 15, 1983, Ser. No. 504,566
Int. Cl.[4] H01Q *1/38*
U.S. Cl. 343—700 MS **27 Claims**



1. A variable-polarization microwave antenna for sending and receiving microwaves at frequencies within a predetermined frequency range, the antenna comprising:

A. first and second generally planar ground-plane conductors spaced apart and extending substantially parallel to each other, said first ground-plane conductor having an aperture therethrough and including first and second pairs of elongated ridges extending into said aperture and oriented perpendicular to each other, the ridges of each pair extending toward each other from opposite sides of said aperture and leaving a gap therebetween;

B. shorting elements extending between said ground-plane conductors and surrounding said aperture to form a cavity defined by said shorting elements and said ground-plane conductors, the distances across said cavity in the directions of said ridges being between one-half and one wavelength at frequencies within the predetermined frequency range;

C. a first feed line including a first elongated feed conductor extending between and generally parallel to said ground-plane conductors and into said cavity substantially in registration with the ridges of said first pair and across the gap therebetween; and

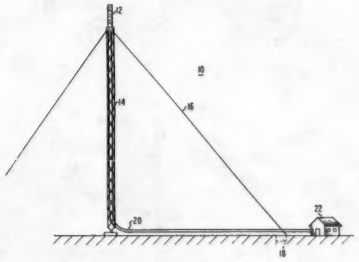
D. a second feed line including a second elongated feed conductor extending between and generally parallel to said ground-plane conductors and into said cavity substantially in registration with the ridges of said second pair and across the gap therebetween, said first and second feed conductors being electrically isolated from each other.

4,590,479

BROADCAST ANTENNA SYSTEM WITH HIGH POWER AURAL/VISUAL SELF-DIPLEXING CAPABILITY

Oded Ben-Dov, Medford, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Mar. 29, 1984, Ser. No. 594,848
Int. Cl.[4] H01Q *13/12*
U.S. Cl. 343—771 **5 Claims**



1. A television broadcasting system, comprising:

a source of UHF visual signal to be broadcast;

a source of UHF aural signal to be broadcast, said aural signal being associated with said UHF visual signal;

a slotted-circular-waveguide UHF antenna for broadcasting UHF television signals applied to a circular-waveguide input port;

a tower upon which said antenna is mounted for achieving wide coverage;

a turnstile junction having first and second pairs of orthogonal rectangular-waveguide input ports, said first pair of input ports comprising first and second ports, and said second pair of ports comprising third and fourth ports, and turnstile junction also comprising a circular waveguide port orthogonal to said first an second pairs of rectangular-waveguide ports;

first rectangular waveguide means coupled to said source of visual signal and to said first rectangular-waveguide port of said turnstile junction for coupling said visual signal to said turnstile junction;

second rectangular-waveguide means coupled to said source of aural signal and to said second rectangular-waveguide port of said turnstile junction for coupling said aural signal to said turnstile junction;

reactive terminating means coupled to said second pair of rectangular-waveguide ports of said turnstile junction for causing said turnstile junction to propagate said visual signal to said circular waveguide port of said turnstile junction with a first direction of first and second directions of circular polarization and for causing said turnstile junction to propagate said aural signal to said circular-waveguide port with said second direction of circular polarization; and

a circular waveguide coupled at a first end to said input port of said antenna and extending along the length of said tower, and coupled at a second end to said circular-waveguide port of said turnstile junction for coupling said visual and aural signals from said turnstile junction to said

antenna with said first and second directions of circular polarization, respectively, whereby said slotted-circular-waveguide antenna broadcasts said UHF visual signal and said associated UHF aural signal.

4,590,480

BROADCAST ANTENNA WHICH RADIATES HORIZONTAL POLARIZATION TOWARDS DISTANT LOCATIONS AND CIRCULAR POLARIZATION TOWARDS NEARBY LOCATIONS

Nicholas Nikolayuk, Gibbsboro, and Thomas V. Sikina, Jr., Moorestown, both of N.J., assignors to RCA Corporation, Princeton, N.J.

Filed Aug. 31, 1984, Ser. No. 646,111
Int. Cl.[4] H01Q *13/10*
U.S. Cl. 343—771 **15 Claims**

1. A broadcast antenna, comprising:

elongated vertically oriented transmission-line means including a conductive outer surface, said outer surface defining a first plurality of bays each of which bays comprises slot antenna radiating means coupled to the interior of said transmision-line means, each of said slot antenna radiating means being vertically oriented for producing horizontally-polarized radiation, said plurality of bays being vertically arrayed between upper and lower locations and energized for producing horizontally-polarized radiation in a pattern having a preselected first peak gain near a horizontal plane and a lesser gain at angles below said horizontal plane; and

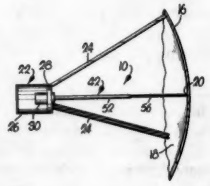
a second plurality less than said first plurality of bays of parasitic radiating means, said second plurality of bays of parasitic radiating means being vertically arrayed at a location centered between said upper and lower locations, each of said parasitic radiating means being associated with one of said slot antenna radiating means for being energized thereby for reradiating substantially vertically-polarized radiation in phase quadrature with said horizontal radiation, said second plurality being selected to produce vertically-polarized radiation, substantially in phase quadrature with said horizontally polarized radiation in a pattern having a preselected second peak gain less than said first peak gain at said angles below said horizontal plane, whereby said antenna produces chiefly horizontal radiation towards distant locations and chiefly circular polarization towards locations near said antenna.

4,590,481

FOCAL FINDER FOR PARABOLIC REFLECTOR ANTENNA

Vernon K. Burditt, 912 W. Main, Ness City, Kans. 67560

Filed Aug. 15, 1983, Ser. No. 523,014
Int. Cl.[4] H01Q *1/00*
U.S. Cl. 343—840 **13 Claims**



1. A device particularly useful for positioning the feed horn or the like of an antenna, relative the reflecting dish of the antenna, said device comprising:

a support head including means for temporarily coupling said head to the feed horn of an antenna in a predetermined orientation; and

rod means operatively coupled to said support head for determining the relative orientation of the feed horn to a reference point on the reflecting dish of an antenna, said rod means including

an elongated first member secured to said support head at a predetermined angular relationship,

an elongated second member having one end disposed adjacent said first member, and

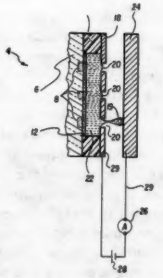
means for operatively coupling said one end of the second member to said first member at a certain angular relationship and operable for positioning the other end of said second member adjacent said satellite dish whereby the relative position of said other end to said reference point on said satellite dish indicates the relative orientation of said feed horn to said reference point.

4,590,482

NOZZLE TEST APPARATUS AND METHOD FOR THERMAL INK JET SYSTEMS

Robert R. Hay, Boise, and Paul R. Spencer, Meridian, both of Id., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Dec. 14, 1983, Ser. No. 561,604
Int. Cl.[4] G01D *18/00*
U.S. Cl. 346—1.1 **2 Claims**



1. Apparatus for testing a thermal ink jet printhead assembly of the type having an electrically conductive printhead member containing a plurality of nozzles adapted to selectively eject conductive ink therefrom, said apparatus comprising electrically conductive means disposed adjacent said printhead

member and having an ink absorbent surface for receiving ink sequentially from all of said plurality of nozzles spaced across a print head member, said ink absorbing surface facing all of said nozzles being tested and spaced a chosen distance therefrom and adapted to receive and come into electrical contact with said ejected ink from said nozzles while said ink is still in contact with said electrically conductive printhead member, circuit means for connecting said electrically conductive printhead member and said electrically conductive means to a voltage source, and means associated with said circuit means for indicating the flow of current in said circuit means.

4,590,483

INK JET PRINTER WITH CHARGING CONTROL OF INK-DROP FLOW VELOCITY

Luc Regnault, Bourg les Valence, and Jean-Paul Maingaud, Bourg-de-Peage, both of France, assignors to Imaje S.A., Bourg les Valence, France

Filed Apr. 23, 1984, Ser. No. 603,127

Claims priority, application France, Apr. 29, 1983, 83 07549; Oct. 13, 1983, 83 16439

Int. Cl.[4] G01D *9/00, 15/18*

U.S. Cl. 346—1.1 **4 Claims**

1. A method for controlling the flow velocity of ink drops of an ink-jet printer comprising the steps of determining the instant t of pinch-off of ink jet drops, determining the instant t1 at which the formed ink drop passes at the level of a charging-control electrode, deducing therefrom the time interval T=t1−t, and controlling ink jet pressurizing means in accordance with the time T taken by each ink drop to travel over the distance D between the pinch-off zone in which ink drops are formed and the charging control electrode.

4,590,484

THERMAL RECORDING HEAD DRIVING CONTROL SYSTEM

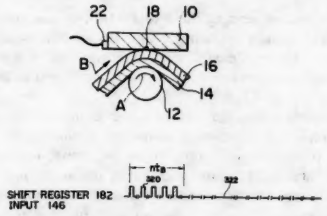
Yoh Matsushita, Yokohama, Japan, assignor to Ricoh Company, Ltd., Japan

Filed Jan. 13, 1984, Ser. No. 570,303

Claims priority, application Japan, Jan. 13, 1983, 58-2820; May 31, 1983, 58-96285; May 31, 1983, 58-96287

Int. Cl.[4] G01D *15/10;* **H05B** *3/00*

U.S. Cl. 346—76 PH **13 Claims**



1. A system for controlling the activation of a heat-producing element mounted on a substrate of a thermal recording head, comprising:

detecting means for detecting the temperature of said substrate;

first storing means for temporarily storing image data in the form of a binary number to be recorded;

pulse forming means connected to receive said image data from said first storing means for forming an activation pulse to be applied to said heat-producing element for activation thereof, said activation pulse being indicative of the level of activation energy to be supplied to said heat-producing element when activated; and

control means connected to said pulse forming means for controlling the level of activation energy of said activation pulse formed by said pulse forming means in response to a temperature signal indicating the temperature of said substrate supplied from said detecting means and said image data supplied from said first storing means, said control means including measuring means for measuring an elapsing time t after the last preceding activation of said heat-producing element, wherein said control means controls the energy level E_{in} of said activation pulse according to the following relation;

$$E_{in}=E_0(1-A\Delta T_p)(1-exp(-t/\ C_1R_1))$$

where,

C_1: thermal capacity of said heat-producing element,

R_1: thermal resistance from said heat-producing element to said substrate,

E_0: energy level required to obtain a recorded image of desired quality when said substrate is at a reference temperature,

A: constant, and

ΔT_p: temperature difference from said reference temperature.

4,590,485

THERMAL RECORDER

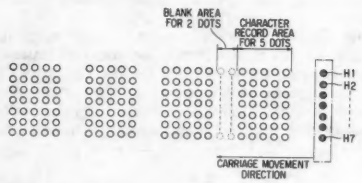
Yuji Uramoto, Matsudo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 23, 1984, Ser. No. 633,294

Claims priority, application Japan, Jul. 29, 1983, 58-139224

Int. Cl.[4] G01D *15/10;* **B41J** *3/20*

U.S. Cl. 346—76 PH **11 Claims**



1. A recorder comprising:

recording means for intermittently recording on a recording medium in recording intervals having a predetermined interval for recording and a specific rest interval;

power supply means for supplying power to actuate said recording means;

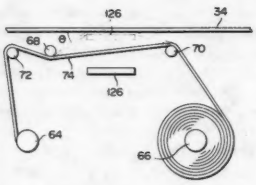
detection means for detecting the power that can be supplied by said power supply means; and

control means for actuating said detection means in a rest interval, determining the power value of a recording signal to be applied to said recording means based on the result of the detection by said detection means, and controlling said recording means.

4,590,486
THERMAL INK TRANSFER PRINTING APPARATUS

Masasumi Yana, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 541,028, Oct. 12, 1983, Pat. No. 4,517,573. This application Feb. 11, 1985, Ser. No. 700,140
Claims priority, application Japan, Oct. 18, 1982, 57-181372
The portion of the term of this patent subsequent to May 14, 2002, has been disclaimed.
Int. Cl.[4] G01D *15/10*
U.S. Cl. 346—76 PH **18 Claims**



1. A thermal ink transfer printing apparatus for recordng on a recording medium a plurality of characters consisting of letters and blanks comprising:

a platen having a surface;

a carriage arranged adjacent to the platen;

a moving means for moving the carriage along a path parallel to said platen surface;

a thermal head including a plurality of heating elements arranged on a line crossing the direction of said path and selectively generating heat in response to electrical signals of the characters;

a support means for supporting the thermal head to the carriage in such a way that the thermal head can reciprocate in relation to the platen;

an ink film having a base layer and an ink layer on the base layer;

a running means for running the ink film between the thermal head and the platen surface with said base layer of said ink film directed to the thermal head;

a pressing means for pressing the thermal head against the platen surface to bring the ink film into close contact with the recording medium supplied between the ink film and the platen surface;

a detecting means for detecting that the number of characters to be applied to the thermal head is a predetermined serial number of blanks to thereby generate a stop signal; aand

a releasing and stopping means for releasing, when the stop signal is applied, the thermal head from the pressing means and stopping the running of the ink film driven by the running means, upon lapse of a certain time from the time when a signal relating to the last letter just before the blanks to be followed is applied to the thermal head.

4,590,487
THERMAL RECORDING APPARATUS

Akio Noguchi; Haruhiko Moriguchi; Toshiharu Inui, and Masayuki Hisatake, all of Kanagawa, Japan, assignors to Fuji Xerox Co., Ltd., Tokyo, Japan

Filed Sep. 28, 1984, Ser. No. 655,739
Claims priority, application Japan, Sep. 29, 1983, 58-179350
Int. Cl.[4] G01D *15/10*
U.S. Cl. 346—76 PH **7 Claims**

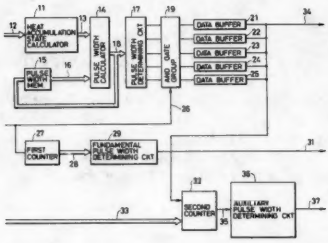
1. A thermal head drive circuit coupled to a source of picture data and to a thermal head made up of a plurality of thermal head elements, said circuit comprising:

a. means, coupled to said thermal head, for generating fundamental drive pulses of preset widths according to said picture data;

b. means for generating supplemental drive pulses, said generating means determining the width of said pulses for each said element from the thermal state of neighboring elements and from the past thermal states of said element and of said neighboring elements, said generating means including

i. first means for storing the thermal states of the two thermal head elements surrounding each element, and

ii. second means for storing the previous thermal states of said surrounding elements; and

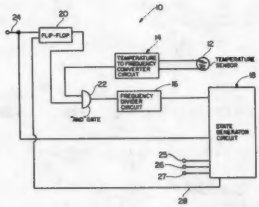


c. means for modifying said supplemental drive pulses according to the percentage of thermal head elements in a line to be activated, said modifying means including a pulse width operator coupled to said thermal head, to said first and second storing means and to said picture data source for changing the width of said supplemental drive pulses according to said picture data.

4,590,488
CIRCUIT FOR CONTROLLING ENERGIZATION OF THERMAL PRINT HEAD

Michael J. Sullivan, Portsmouth, R.I., assignor to Astro-Med, Inc., West Warwick, R.I.

Filed May 28, 1985, Ser. No. 737,921
Int. Cl.[4] B41J *3/20*
U.S. Cl. 346—76 PH **2 Claims**



1. A circuit for controlling the energization of a plurality of thermal print head elements on a thermal print head comprising:

a. means for sensing the temperature of said head;

b. first signal generating means responsive to said temperature sensing means for generating an electrical signal having a frequency which is proportional to the temperature of said head;

c. second signal generating means communicating with said first signal generating means and actuatable for generating a predetermined number of sequential output pulses of substantially uniform duration during a period of time wherein the temperature of said head remains substantially constant and wherein said duration is substantially proportional to the frequency of said first signal generating means, said second signal generating means communi-

cating with said print head elements for sequentially controlling the energization of different print head elements with sequential pulses; and

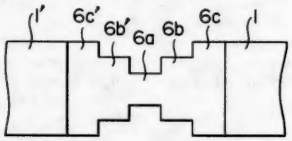
d. means for actuating said second signal generating means in response to an input signal to said circuit and for automatically deactuating said second signal generating means after said predetermined number of sequential pulses has been produced therefrom, said means for actuating and deactuating comprising a bistable multivibrator and gate means, said first signal generating means communicating with said second signal generating means through said gate means, said bistable multivibrator being responsive to an input signal to said circuit for actuating said gate means to provide said communication between said first signal generating means and said second signal generating means.

4,590,489

THERMAL HEAD

Makoto Tsumura, and Ryozo Takeuchi, both of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 28, 1985, Ser. No. 706,953
Claims priority, application Japan, Mar. 2, 1984, 59-40871
Int. Cl.[4] B41J *3/20*
U.S. Cl. 346—76 PH **11 Claims**



1. A thermal head comprising:

at least a pair of opposite electrodes; and

a heating resistor connected between said pair of electrodes;

said heating resistor being formed of a plurality of resistive units, each of said resistive units including at least one resistive element having a substantially rectangular parallelepiped shape, said at least one resistive element of said resistive units being electrically connected in series and formed in such a size that when a unit current flows in said heating resistor, applied energy per unit surface area of a resistive element of each resistive unit is different from the applied energy per unit surface area of a resistive element of the other resistive units.

4,590,490

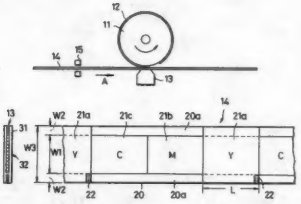
THERMAL TRANSFER COLOR RECORDER

Itsuo Takanashi; Hideshi Tanaka; Terumi Ohara, all of Yokohama; Shigeru Kato, Hino; Toshinori Takahashi, Kawasaki; Tsutomu Kiuchi, Yokohama, and Hiroki Kitamura, Tokyo, all of Japan, assignors to Victor Company of Japan, Ltd., Japan

Filed Nov. 29, 1984, Ser. No. 676,003
Claims priority, application Japan, Dec. 2, 1983, 58-227969
Int. Cl.[4] G01D *15/10*; **B41J** *3/10*
U.S. Cl. 346—76 PH **7 Claims**

1. An apparatus for performing thermal transfer recording by use of an ink ribbon having a plurality of ink parts which are coated with ink of different colors, said ink parts being successively arranged in a longitudinal direction of the ink ribbon, a first ink part of said plurality of ink parts being coated with a first color ink and having a width W_3 which is larger than a width W_1 of a second ink part of said plurality of ink parts, which second ink part is coated with a second color ink of a predetermined width W_2, said apparatus comprising:

a thermal printing head for carrying out a recording operation in which information is recorded in one line on a piece of recording paper with each one of said inks of different colors at a time, said thermal printing head comprising a main head body, a plurality of information recording heating resistor elements arranged in one line on said main head body over a range which is essentially the same as said width W_1, for recording the information by melting each color ink coated on the ink parts and successively transferring the melted ink onto the recording paper, one or a plurality of mark recording heating resistor elements provided on said main head body at one or a plurality of positions within a range of said predetermined width W_2, for recording at least one synchronization mark on the recording paper by melting the first color ink coated on the first ink part within said predetermined width W_2 and transferring the melted ink onto the recording paper, and detecting means for detecting a prerecorded synchronization mark on the recording paper, said one or the plurality of mark recording heating resistor elements and said detecting means being in line with said plurality of information recording heating resistor elements;



displacing means for displacing said recording paper and said ink ribbon passing over said thermal printing head so that said recording paper is successively contacting one of said ink parts; and

control means for controlling heating of said information recording heating resistor elements and said one or the plurality of mark recording heating resistor elements in response to the displacement of the recording paper and said ink ribbon to carry out a printing operation such that said information is printed on said recording paper in said different colors in succession starting with said first color ink and said at least one synchronization mark is printed on said recording paper and is synchronized with a start of printing with said first color,

said control means after a completion of the printing operation with the first color, controlling heating of said information recording heating resistor elements in response to a signal from said detection means so that said printing operation is continued with said second color ink started in synchronism with a detection of said previously printed synchronization mark.

4,590,491

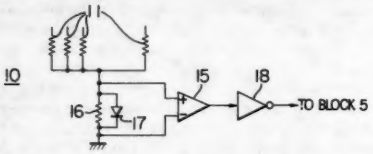
THERMAL TRANSFER PRINTER

Yasuro Hori, Katsuta, and Nobuo Abe, Ibaraki, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jun. 7, 1984, Ser. No. 618,256
Claims priority, application Japan, Jun. 9, 1983, 58-101653
Int. Cl.[4] H05B *3/00*
U.S. Cl. 346—76 PH **12 Claims**

1. A thermal transfer printer wherein pigment or dye on a thermal transfer paper is transferred to a recording paper by means of a thermal print head, said printer comprising means for seriating closely a plurality of current pulses having a sufficiently small time width to produce a current supplied to each of thermal elements of said print head for a printing operation; and means for detecting that any of said current

pulses flows in at least in one of said thermal elements and for terminating the printing operation for said thermal elements



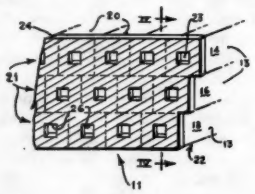
when none of said thermal elements is found to conduct said current pulse.

4,590,492

HIGH RESOLUTION OPTICAL FIBER PRINT HEAD

Michael J. Meier, Diamond Bar, Calif., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jun. 7, 1983, Ser. No. 502,028
Int. Cl.[4] G01D *9/42;* **G03B** *27/00, 15/00;* **B41B** *13/00*
U.S. Cl. 346—107 R **4 Claims**



1. A module for a printing head of a line printer comprising:

a plurality of fiber optic ribbons having therein fiber optic bundles in linear assemblies each of said fiber optic ribbons having an input end and an output end, said input end being adapted to receive a plurality of light sources, said input end having one light source for each of said bundles, said output end of each of said ribbons being bonded to an adjacent ribbon output end, an array of bonded bundles being formed having therein a plurality of substantially parallel rows, the bundles of each row being staggered with respect to bundles in adjacent rows, said array of bonded bundles having a substantially flat surface; and

a mask being photo-lithographed onto said substantially flat surface, said mask having a plurality of apertures therein, each of said apertures being centered on a fiber optic bundle in said output end, each of said apertures having a width less than said fiber optic bundle, a closest aperture in an adjacent fiber optic ribbon being offset a horizontal distance approximately equal to said width of said apertures, said plurality of ribbons being equal to an integral number of aperture widths between two adjacent apertures in a row plus one.

4,590,493

OPTICAL DISC

Takao Inoue, Hirakata, and Munehiro Yoshimura, Moriguchi, both of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

PCT No. PCT/JP83/00377, § 371 Date Jun. 26, 1984, § 102(e) Date Jun. 26, 1984, PCT Pub. No. WO84/01848, PCT Pub. Date May 10, 1984
PCT Filed Oct. 25, 1983, Ser. No. 626,838
Claims priority, application Japan, Oct. 26, 1982, 57-188523
Int. Cl.[4] G01D *15/34;* **G11B** *7/24;* **G03C** *5/04*
U.S. Cl. 346—135.1 **3 Claims**

1. An optical disc which comprises:

a. a light permeable resin disc,

b. a metal film formed on at least one surface of said resin disc,

c. a protective film formed on said metal film, said protective film being made of a set film of an ultraviolet setting type composition having excellent adhesion to said metal film, and

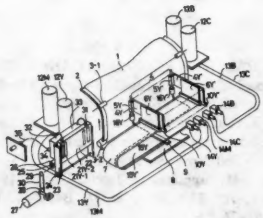
d. a hard coating film formed on said protective film and on the opposite surface of the resin disc, said hard coating film being made of a set film of an ultraviolet setting type composition higher in crosslinking density than said protective film and excellent in light permeability.

4,590,494

MULTICOLOR RECORDING APPARATUS

Hiroo Ichihashi; Shigeo Toganoh, and Yohji Matsufuji, all of Tokyo, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 7, 1983, Ser. No. 558,983
Claims priority, application Japan, Dec. 15, 1982, 57-219528
Int. Cl.[4] G01D *15/18*
U.S. Cl. 346—140 R **8 Claims**



1. A multicolor recording apparatus comprising:

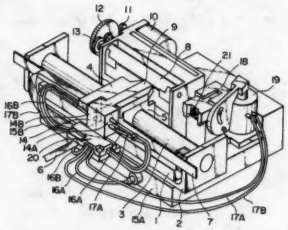
a plurality of independently drivable recording means of the same color; and

a distributor for distributing and supplying recording liquid of said color to said plurality of recording means of the same color, said distributor including a plurality of communication holes for distributing and supplying the recording liquid to the respective said recording means, the opening areas of said communication holes for the liquid distribution and supply being variable in a predetermined relationship with each other.

4,590,495
MULTI-COLOR INK JET PRINTER

Shigeru Okamura, Yokohama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 476,254, Mar. 17, 1983, abandoned. This application Aug. 22, 1985, Ser. No. 767,701
Claims priority, application Japan, Mar. 25, 1982, 57-46293
Int. Cl.[4] G01D *15/16*
U.S. Cl. 346—140 R **4 Claims**

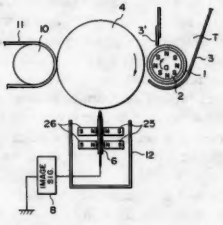


1. An ink jet printer comprising:
a movable carriage mounted for reciprocating movement;
sub-tank means including first and second sub-tanks mounted on said carriage and juxtaposed along the direction of movement thereof, each said sub-tank including a port facing along the direction of movement of said carriage in mutually opposing directions;
main tank means including first and second main tank chambers for storing first and second inks of different colors, respectively; and
a pair of flexible supply tubes, each being connected between one of said ports and one of said main tank chambers for supplying ink of a particular color to each said sub-tank from a respective said main tank chamber, said flexible supply tubes thereby being evenly arranged at the opposite sides of said sub-tank means such that the driving load of said carriage is substantially uniform along the path of reciprocating movement of said carriage.

4,590,496
IMAGE RECORDING APPARATUS

Tsutomu Toyono, Yokohama; Yuji Sakemi, Kawasaki, and Haruo Fujii, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jun. 5, 1984, Ser. No. 617,609
Claims priority, application Japan, Jun. 10, 1983, 58-104042
Int. Cl.[4] G01D *15/06*
U.S. Cl. 346—153.1 **8 Claims**

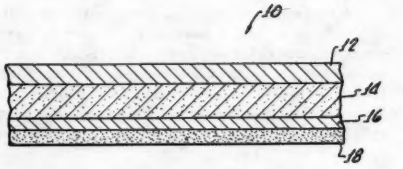


1. An image recording apparatus, comprising:
a recording electrode having an array of electrically isolated electrode elements;
a recording material having a surface opposed to said recording electrode;
means for applying conductive and magnetic toner particles to said surface of said recording material to form an image thereon;
magnetic field generating means for applying a magnetic field across the clearance between said recording material and said recording electrode, said magnetic field generating means being disposed adjacent said recording electrode;
means for applying an imagewise voltage signal between said recording electrode and said recording material; and
toner removing means for removing by magnetic attraction excess toner particles not used in image formation, said toner removing means being disposed adjacent said recording electrode and between said recording material and said magnetic field generating means, wherein said toner removing means includes a magnetized member of magnetic material movable along said array of said electrode elements and said magnetized member is magnetized by the magnetic force of said magnetic field generating means for attracting excess toner particles.

4,590,497
HEAT INSULATED THERMOSENSITIVE PAPER

Tomoo Shibata, Irvine; Wissam J. Jurdi, Tustin, and Minoru Nomura, Irvine, all of Calif., assignors to Ricoh Electronics, Inc., Irvine, Calif.

Filed Nov. 5, 1984, Ser. No. 668,083
Int. Cl.[4] B41M *5/18*
U.S. Cl. 346—201 **29 Claims**



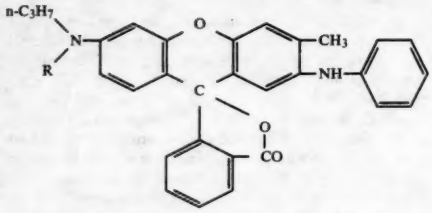
22. A method for identifying and/or marking goods comprising the steps of:
applying a thermosensitive color-forming layer on one side of a substrate;
applying a heat-reflecting layer on another side of the substrate;
applying a delayed action adhesive on said heat reflecting layer to form a thermosensitive recording label, said delayed action adhesive becoming activated to a tacky state when heated to a preselected activated temperature;
heating selected areas of said thermosensitive color-forming layer to form an image thereon for identifying and/or marking goods upon which the thermosensitive recording label is to be applied;
heating the delayed action adhesive to the preselected activated temperature; and,
sticking the thermosensitive recording label to the goods by means of the activated delayed action adhesive.

4,590,498
CHROMOGENIC RECORDING MATERIALS

Masakichi Yahagi, Tokyo; Tetsuo Igaki, Kawagoe; Sinzi Yosinaka, Iwatsuki; Kousaku Morita, Saitama; Morikuni Saito, Tokyo, and Kimiaki Kinoshita, Kitamoto, all of Japan, assignors to Shin Nisso Kako Co., Ltd., Japan

Filed Feb. 23, 1984, Ser. No. 583,019
Int. Cl.[4] B41M *5/16, 5/18, 5/22*
U.S. Cl. 346—208 **13 Claims**

1. A chromogenic material which comprises a fluoran compound of the formula



(I)

wherein R represents a methyl or ethyl group, an acidic material capable of causing color formation of said fluoran compound and a substrate which supports the fluoran compound and the acidic substance on its surface.

4,590,499

HEAT-SENSITIVE RECORDING SHEET

Fumio Fujimura; Toshimi Satake; Manabu Mori; Toshiaki Minami, and Tadakazu Fukuchi, all of Tokyo, Japan, assignors to Jujo Paper Co., Ltd., Tokyo, Japan

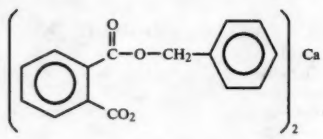
Filed Aug. 5, 1985, Ser. No. 762,918

Claims priority, application Japan, Aug. 15, 1984, 59-170153

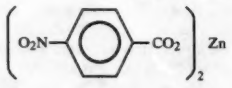
Int. Cl.⁴ B41M *5/18*

U.S. Cl. 346—209 **6 Claims**

1. A heat-sensitive recording sheet comprising on the surface of the support sheet a heat-sensitive color-developing layer containing colorless basic dye and an organic color developer, and a overcoat layer on said heat-sensitive color-developing layer and a back-coat layer on the back side of the support, said heat-sensitive color-developing containing calcium monobenzyl phthalate or zinc p-nitrobenzoate of the following general formula (I) or (II) as a stabilizer;



(I)



(II)

4,590,500

HEAT-SENSITIVE RECORDING SHEET

Toshimi Satake; Yoshihide Kimura, and Fumio Fujimura, all of Tokyo, Japan, assignors to Jujo Paper Co., Ltd., Tokyo, Japan

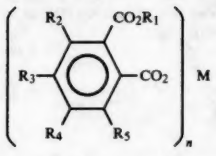
Filed Aug. 21, 1984, Ser. No. 642,788

Claims priority, application Japan, Aug. 24, 1983, 58-153083

Int. Cl.⁴ B41M *5/18*

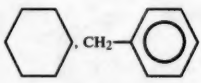
U.S. Cl. 346—209 **9 Claims**

1. Heat-sensitive recording sheet having a color forming layer comprising a colorless basic dyestuff and a organic color-developing agent, wherein said color-forming layer contains a metal derivative of phthalic acid monoester having the general formula (I) as stabilizer



(I)

where R_1 represents CH_3, C_2H_5, C_3H_7, iso-C_3H_7, tert-C_4-H_9, C_5H_{11},



or C_6H_5; R_2, R_3, R_4 and R_5 represent individually H, alkyl or sulfonyl group; M represents a polyvalent metal; and n represents an integer of 2 or 3.

4,590,501

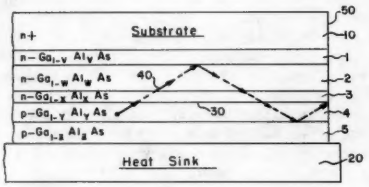
EDGE-EMITTING LIGHT EMITTING DIODE

Frederick W. Scholl, Riverdale, N.Y., assignor to Codenoll Technology Corporation, Yonkers, N.Y.

Filed Sep. 15, 1983, Ser. No. 532,731

Int. Cl.⁴ H01L *33/00*

U.S. Cl. 357—17 **27 Claims**



1. In a light emitting diode of the edge-emitting type comprising a plurality of contiguous semiconductor layers one of which forms an active layer with a p-n junction thereat and into which carriers are injected when a bias voltage is applied,

means to establish a transverse optical cavity for supporting optical wave propagation in a direction parallel to said active layer when a voltage is applied across said junction with radiation being emitted from said device at an end surface thereof, said means comprising:

a first layer of semiconductor material located within said optical cavity for confining carriers in said active layer,

a second layer of semiconductor material comprising a material that absorbs relatively little of the energy of the photons that tunnel through said first layer, said second layer being located within said optical cavity so that said first layer lies between said active layer and said second layer and said second layer having a thickness that is greater than the thickness of said active layer and said first layer, and

means surrounding said active layer, said first layer and said second layer and extending in a direction parallel to said active layer for confining the photons that tunnel through said first layer, said confining means comprising a semiconductor material having a refractive index lower than that of the material comprising said active and second layers,

said first layer having a thickness that simultaneously maximizes the number of photons that tunnel through said first

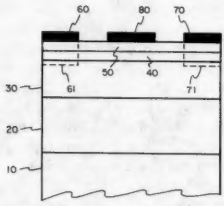
layer from said active layer into said second layer while confining carriers in said active layer.

4,590,502

CAMEL GATE FIELD EFFECT TRANSISTOR DEVICE

Hadis Morkoc, Urbana, Ill., assignor to University of Illinois, Urbana, Ill.

Filed Mar. 7, 1983, Ser. No. 472,691
Int. Cl.⁴ H01L *29/80*
U.S. Cl. 357—22 **7 Claims**



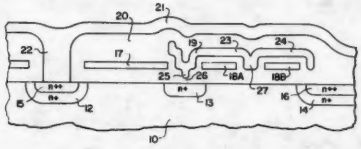
1. A field-effect transistor device, comprising:
a support region;
a semiconductor channel layer of one conductivity type disposed on the support region;
a first highly-doped semiconductor layer of opposite conductivity type disposed on said channel layer;
a second highly-doped semiconductor layer of said one conductivity type disposed on said first highly-doped semiconductor layer;
source and drain electrodes disposed in spaced relation on said second higly-doped semiconductor layer and extending through said second and first highly-doped semiconductor layers to said channel layer; and
a gate electrode disposed on said second highly-doped semiconductor layer in the region between said source and drain electrodes.

4,590,503

ELECTRICALLY ERASABLE PROGRAMMABLE READ ONLY MEMORY

Eliyahou Harari, Los Altos, and Ranendu M. Das, Fremont, both of Calif., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jul. 21, 1983, Ser. No. 516,172
Int. Cl.⁴ H01L *29/78*
U.S. Cl. 357—23.5 **11 Claims**



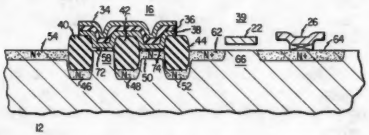
1. A floating gate electrically erasable programmable read only memory cell comprising:
a semiconductor body having a major surface, said body having first and second regions of a first conductivity type and a first region of a second conductivity type, all adjacent to said first major surface, said first region of said second conductivity type lying between said first and second regions of said first conductivity type;
control gate means overlying a portion of said first region of said second conductivity type and separated therefrom by a dielectric material, electrical conditions on said control gate means being capable of affecting the effective electrical conductivity in said first region of said second conductivity type; and
floating gate means having a coupling region, a control region, and a tunneling region, said coupling region overlying said control gate means and being separated therefrom by said dielectric material, said control region being adjacent to said first region of said second conductivity type and separated therefrom by said dielectric material, electrical conditions on said control region being capable of affecting the effective electrical conductivity in said first region of said second conductivity type, and said tunneling region being adjacent to said first region of said first conductivity type and separated therefrom by said dielectric material, said tunneling region being separated from said major surface by a distance which is substantially smaller than that separating said control region from said major surface.

4,590,504

NONVOLATILE MOS MEMORY CELL WITH TUNNELING ELEMENT

Daniel C. Guterman, Plano, Tex., assignor to Thomson Components - Mostek Corporation, Carrollton, Tex.

Filed Dec. 28, 1982, Ser. No. 454,056
Int. Cl.⁴ H01L *29/78*
U.S. Cl. 357—23.11 **9 Claims**



1. A nonvolatile memory cell, comprising:
a semiconductor substrate,
source and drain regions implanted in said substrate below the surface thereof and defining a channel region therebetween,
first and second step insulators fabricated respectively over said source and said drain regions,
a gate insulator fabricated on said substrate over said channel region,
a tunneling element fabricated on said substrate adjacent a side of one of said step insulators that is farthest from said gate insulator and overlying at least a portion of one of said regions,
a conductive floating gate fabricated to extend over said gate insulator, said tunneling element and at least partially over each of said step insulators,
an isolation insulator fabricated on said floating gate, and
a conductive control gate fabricated on said isolation insulator wherein said control gate is capacitively coupled to said floating gate.

4,590,505

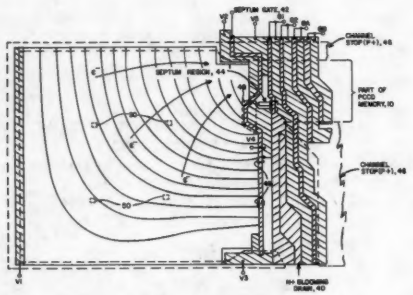
THREE DIMENSIONAL OPTICAL RECEIVER HAVING PROGRAMMABLE GAIN SENSOR STAGES

Nathan Bluzer, Silver Spring, Md., assignor to The United States of America as represented by the Secretary of the Air Force, Washington, D.C.

Filed Jan. 10, 1984, Ser. No. 569,639
Int. Cl.⁴ H01L *29/78*
U.S. Cl. 357—24 **7 Claims**

1. A three dimensional imaging receiver having a plurality of sensor units stacked in a staircase configuration whereby image detection positions of infraposed ones of said sensor units are exposed to form a composite image detection area for said receiver, each of said sensor units comprising:

a plurality of radiation detectors,
a plurality of programmable gain stages each coupled to one of said plurality of detectors,
a buffer memory coupled to each of said programmable gain stages, and
multiplexing and readout means coupled to said buffer memory for deriving image data from said receiver;
said plurality of radiation detectors each including:
a substantially rectangular segment of P-type semiconductor material having a first edge adjacent one of said plurality of programmable gain stages,
an N-epitaxial layer formed on the top surface of said rectangular segment,



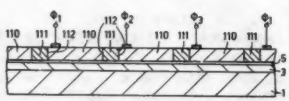
an insulative layer formed on the top surface of said N-epitaxial layer,
a resistive sheet disposed on the top surface of said insulative layer,
first biasing means positioned along a second edge of said rectangular segment,
second biasing means positioned adjacent the corner of said first edge and a third edge of said reactangular segment, and
third biasing means positioned adjacent the corner of said first edge and a fourth edge of said rectangular segment,
said first, second and third biasing means having potentials applied thereto for selectively altering the shape of the electric field established within said resistive sheet.

4,590,506

CHARGE-COUPLED BURIED-CHANNEL DEVICE WITH HIGH-RESISTIVITY GATE ELECTRODES

Leonard J. M. Esser, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 6, 1983, Ser. No. 539,447
Claims priority, application Netherlands, Oct. 6, 1982, 8203870
Int. Cl.⁴ H01L *29/78*
U.S. Cl. 357—24 **3 Claims**



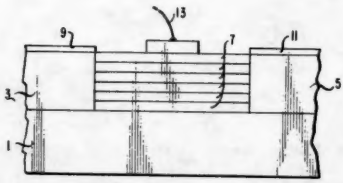
1. A charge-coupled buried-channel semiconductor device having an MIS element, which comprises:
a monocrystalline semiconductor body having a major surface;
a comparatively thin dielectric layer on said major surface and forming the gate dielectric of said MIS element;
a gate electrode of doped semiconductor material on said thin dielectric layer for influencing the surface potential in the semiconductor body;
means for electrically decoupling said gate electrode from said semiconductor body, said means comprising a high-resistivity part of said gate electrode adjoining said gate dielectric and having a sufficiently low doping concentration and a conductivity type such that, during operation of the device, while avoiding breakdown, a depletion layer can be formed which extends from the gate dielectric into the high-resistivity part of said gate electrode;
a plurality of similar gate electrodes on the thin dielectric layer at a distance from each other, and a subjacent channel region, said plurality of similar gate electrodes, together with said gate electrode, comprising a row of clock electrodes to which clock voltages can be applied for sequentially storing/transferring packets of charge carriers in the subjacent channel region, said clock electrodes being provided in the form of a continuous layer of polycrystalline silicon divided into a row of high-resistivity parts which form the clock electrodes of the charged-coupled device, which are provided with means for applying clock voltages, and which are separated by intermediate electrically-floating parts of a first conductivity type;
a surface region of said first conductivity type which is formed in the semiconductor body, adjoining the surface and forming the channel region of the charge-coupled device, at least the high-resistivity parts of the clock electrodes being of a second, opposite conductivity type and the surface region being limited on its side remote from the surface by an isolating p-n junction and having a thickness of at most 1.0 μm.

4,590,507

VARIABLE GAP DEVICES

Federico Capasso, Westfield; Arthur C. Gossard, Warren, and Michael J. Stavola, Westfield, all of N.J., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jul. 31, 1984, Ser. No. 636,155
Int. Cl.⁴ H01L *23/56, 27/12*
U.S. Cl. 357—28 **19 Claims**



1. A device comprising first and second semiconductor regions, first and second electrical contacts to said first and second regions, respectively, a third region between said first and second semiconductor regions, said third region comprising at least one graded bandgap region, a confining region adjacent said third region, said confining region and said third region forming a carrier confining energy well.

4,590,508

MOS STATIC RAM WITH CAPACITIVELY LOADED GATES TO PREVENT ALPHA SOFT ERRORS

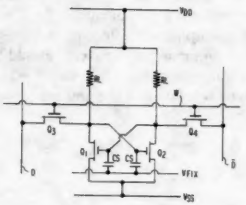
Noboru Hirakawa, and Tohru Tsujide, both of Tokyo, Japan, assignors to Nippon Electric Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 229,432, Jan. 29, 1981, abandoned. This application Nov. 29, 1983, Ser. No. 555,420

Claims priority, application Japan, Jan. 29, 1980, 55-9069; Jan. 29, 1980, 55-9070

Int. Cl.⁴ H01L *27/04, 29/78;* **G11C** *11/40*

U.S. Cl. 357—41 **14 Claims**



2. In a semiconductor memory device including a semiconductor substrate, a plurality of memory insulated gate field effect transistors formed on said substrate, and a plurality of transfer insulated gate field effect transistors, each of said transfer transistors operatively transferring a logic signal to a gate of an associated one of said memory transistors, and each of said memory transistors holding the transferred logic signal at its gate, the improvement comprising: a conductive layer covering gates of said memory transistors through an insulator layer to provide independent capacitances between said gates of said memory transistors and said conductive layer, said insulator layer including a silicon-nitride film having the same pattern as said conductive layer and underlying said conductive layer, and means for supplying said conductive layer with a constant voltage.

4,590,509

MIS HIGH-VOLTAGE ELEMENT WITH HIGH-RESISTIVITY GATE AND FIELD-PLATE

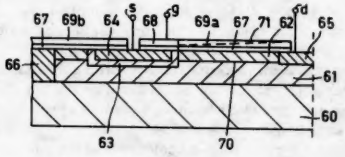
Leonard J. M. Esser; Henricus M. J. Vaes, and Adrianus W. Ludikhuize, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Oct. 6, 1983, Ser. No. 539,448

Claims priority, application Netherlands, Oct. 6, 1982, 8203870

Int. Cl.⁴ H01L *29/78, 29/04, 27/04, 29/40*

U.S. Cl. 357—53 **9 Claims**



1. A semiconductor device comprising an element of the MIS type having a monocrystalline semiconductor body, one surface of which is provided with a comparatively thin dielectric layer which constitutes a gate dielectric of the MIS element and on which is formed a gate electrode of doped semiconductor material for influencing the surface potential in the semiconductor body, and means for electrically decoupling said gate electrode from said semiconductor body, said means comprising a high-resistivity part of said gate electrode adjoining said gate dielectric and having a sufficiently low doping concentration and a conductivity type such that, during operation of the device, while avoiding breakdown, a depletion layer can be formed which extends from the gate dielectric into the high-resistivity part of said gate electrode, wherein the device comprises a high-voltage element, at least the high-resistivity part of said gate electrode comprising a field plate, said field plate comprising adjacent regions of opposite conductivity types which form a rectifying junction for draining minority change carriers.

4,590,510

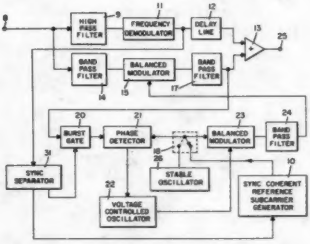
SYSTEM FOR PROCESSING A COMPOSITE COLOR TELEVISION SIGNAL OBTAINED FROM A RECORDING MEDIUM

Peter W. Jensen, Fremont, Calif., assignor to Ampex Corporation, Redwood City, Calif.

Filed Jun. 28, 1974, Ser. No. 484,185

Int. Cl.⁴ H04N *9/89*

U.S. Cl. 358—19 **14 Claims**



1. A system for processing a composite color television signal having field, horizontal line, and color burst synchronizing components and incoherent luminance and chrominance components, said luminance component being coherent with said horizontal line synchronizing component and said chrominance component being coherent with said color burst component, comprising:

(a) means coupled to receive said composite signal and separate said chrominance and luminance components;

(b) means for providing an output signal phase responsive to phase variations of said separated chrominance component variations;

(c) means responsive to the horizontal line synchronizing component to generate a subcarrier signal coherent with said luminance component; and

(d) coding means receiving said separated chrominance component and responsive to said coherent subcarrier signal generating means and to said means for providing said output signal to encode said chrominance component to be coherent with said luminance component.

4,590,511

CIRCUIT FOR CONVERTING THE PHASE ENCODED HUE INFORMATION OF A QUADRATURE MODULATED COLOR SUBCARRIER INTO DISTINCT ANALOG VOLTAGE LEVELS

Curtis J. Bocchi, St. Paul; Donald A. Eide, Maple Grove, and Rebecca A. Hart, New Hope, all of Minn., assignors to Honeywell Inc., Minneapolis, Minn.

Filed Jan. 3, 1984, Ser. No. 567,710

Int. Cl.⁴ H04N *9/64, 9/74*

U.S. Cl. 358—21 R **7 Claims**

1. In combination:

means isolating the chroma information from composite video color signal having a quadrature modulated color subcarrier;

and means transforming the phase encoded hue information of the quadrature modulated subcarrier into unique analog voltages.

4,590,512

CIRCUIT FOR DETECTING THE RATIO OF INTENSITIES OF THE COLOR COMPONENTS OF LIGHT

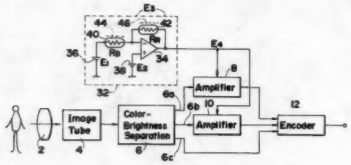
Takashi Kondo, Izumi, Japan, assignor to Minolta Camera Kabushiki Kaisha, Osaka, Japan

Filed Apr. 4, 1984, Ser. No. 596,840

Claims priority, application Japan, Apr. 4, 1983, 58-59713; Jan. 20, 1984, 59-9110

Int. Cl.[4] H04N *9/73*

U.S. Cl. 358—29 **10 Claims**



1. A color component ratio detection circuit comprising:

means for generating a current proportional to the intensity of a first color component of light; and

a voltage generating means including a photoconductive element which detects the intensity of a second color component of the light and electrically connected such that the current generated by said current generating means flows therethrough, said voltage generating means generating, across said photoconductive element, a voltage proportional to the ratio between the intensities of said first and second color components.

4,590,513

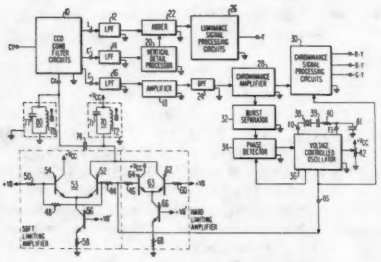
ODD HARMONIC SIGNAL GENERATOR

Jack Craft, Bridgewater, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Sep. 30, 1983, Ser. No. 537,815

Int. Cl.[4] H04N *9/78*; H02M *5/275*

U.S. Cl. 358—31 **10 Claims**



1. An odd harmonic signal generator comprising:

means for providing a sinusoidal input signal wherein the amplitude of said sinusoidal input signal may vary over a range of values;

a soft limiting amplifier, responsive to said sinusoidal input signal and providing an amplitude limited output signal for all amplitude values of said sinusoidal input signal within said range of amplitude values;

a hard limiting amplifier responsive to said sinusoidal input signal and providing an amplitude limited output signal for all amplitude values of said sinusoidal input signal within said range of amplitude values, wherein the phase of said second amplifier output signal is the opposite of the phase of said first amplifier output signal; and

means for combining the output signals from said soft limiting and hard limiting amplifiers to provide a combined output signal comprising components at odd harmonics of the fundamental frequency of said sinousoidal input signal to the relative exclusion of a component at said fundamental frequency.

4,590,514

COLOR IMAGE PROCESSING APPARATUS

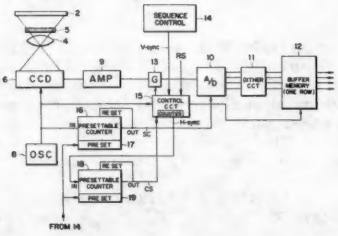
Yoshinori Ikeda, Matsudo, and Nobuo Matsuoka, Yokohama, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 11, 1983, Ser. No. 512,630

Claims priority, application Japan, Jul. 19, 1982, 57-124361; Jul. 19, 1982, 57-124362

Int. Cl.[4] H04N *1/46*

U.S. Cl. 358—75 **8 Claims**



1. A color image forming apparatus comprising:

reading means for reading a color original image on a basis of line to generate color component signals line by line;

recording means for recording on a recording medium a plural member of different color pixels based on the color component signals generated from said reading means to form a color image; and

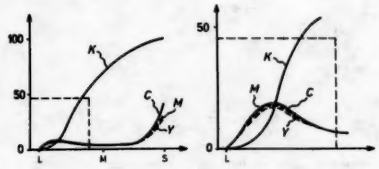
control means for controlling a color tone of the color image to be formed by said recording means by means of varying on each color a recording density of the color pixels to be recorded on the recording medium, said control means comprising gating means for extracting the color component signals entered on a line by line basis at different line intervals for each color, and sampling means for extracting the color component signals entered on a line by line basis at different pixel intervals for each color, wherein said control means controls the color component signals from said reading means so as to be supplied through said gating means and said sampling means to said recording means.

4,590,515

METHOD AND APPARATUS FOR MODIFYING COLOR REDUCTION DEPENDING ON TONE

Klaus Wellendorf, Kitzeberg, Fed. Rep. of Germany, assignor to Dr.-Ing. Rudolf Hell GmbH, Fed. Rep. of Germany

Filed May 13, 1983, Ser. No. 494,460
Claims priority, application European Pat. Off., May 29, 1982, 82104745.3
Int. Cl.[4] H04N *1/46*
U.S. Cl. 358—75 10 Claims



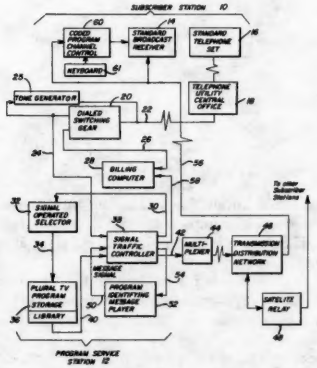
1. A method of tone-dependent color reduction in four-color printing, whereby the color components of the chromatic printing inks yellow (Y), magenta (M) and cyan (C) are reduced and the amount of black (K) printing ink is increased to compensate for such reduction, and a nearly achromatic synthesis of printing is employed from a light tone area to a dark tone area which corresponds to the full tone of the black printing ink employed, and the color components of the chromatic printing inks rise from this gray tone value up to the shadow characterized in that, in order to avoid breaks or steps in the light tone area, the color components of the chromatic printing inks Y, M and C are boosted in the light tone area.

4,590,516

RECORDED PROGRAM COMMUNICATION SYSTEM

Nicholas F. Abraham, Cape Coral, Fla., assignor to World Video Library, Inc., Fort Worth, Tex.

Filed Jun. 1, 1982, Ser. No. 383,604
Int. Cl.[4] H04L *7/18*
U.S. Cl. 358—86 19 Claims



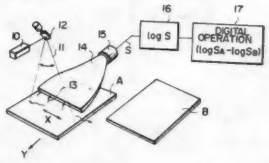
1. In a communication system having a plurality of subscriber stations each of which has a carrier signal broadcast receiver and a conventional telephone instrument associated with a telephone communication network, and a remote subscriber service station coupled to said telephone network by a switching mechanism through which signal readout of a program storing library is controlled in response to telephone dialed selection signals from the subscriber station for transmission of selected program signals through a signal carrier distribution network to the receivers at the subscriber stations, the improvement comprising signal traffic controller means operatively connecting the switching mechanism and the distribution network to the program storing library for automatically establishing separate signal paths for the telephone dialed signals and the selected program signals, signal content identifying means for generating an identifying signal of predetermined duration, means for inserting the identifying signal through the same established signal path corresponding to the selected program signals prior to transmission thereof, and means for registering transmission of the selected program signals in response to completion of the identifying signal.

4,590,517

SUBTRACTION PROCESSING METHOD FOR RADIATION IMAGES

Hisatoyo Kato, and Takao Komaki, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Mar. 21, 1983, Ser. No. 477,542
Claims priority, application Japan, Mar. 20, 1982, 57-45475
Int. Cl.[4] H05B *33/12*
U.S. Cl. 358—111 9 Claims



1. A subtraction processing method for radiation images comprising the steps of:

(a) scanning two or more stimulable phosphor sheets exposed to a radiation transmitting through an object under conditions different from one another and stored radiation images of said object therein, at least a part of image information being different among said radiation images with stimulating rays,

(b) photoelectrically reading out the amounts of said emitted light and converting them into digital image signals, and

(c) conducting subtraction of said digital image signals between the corresponding picture elements of said radiation images to obtain a signal for forming an image of a specific structure contained in at least one of said radiation images.

4,590,518

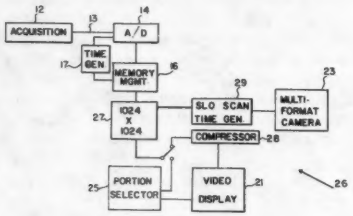
ARRANGEMENT FOR PROCESSING DATA IN DIGITAL FLUOROGRAPHIC SYSTEMS

Paul Fenster, Petach Tikvah, and Dan Inbar, Haifa, both of Israel, assignors to Elscint Ltd., Haifa, Israel

Filed Nov. 14, 1983, Ser. No. 551,700
Int. Cl.[4] H04N *5/32, 7/01;* H05G *1/64*
U.S. Cl. 358—111 10 Claims

1. A digital fluorographic system for displaying fluorographic images, said system comprising: image acquisition means for acquiring digital images for the interior of a subject's body, means for providing video displays of the acquired images, means for providing photographic displays of said acquired images, an image matrix being of a first size for holding digital data, first transfer means for supplying the image data to said video display means as data from a smaller size matrix than said first size matrix, wherein said smaller size

matrix is derived from first size matrix, and second transfer means for supplying the data from said first size matrix to said



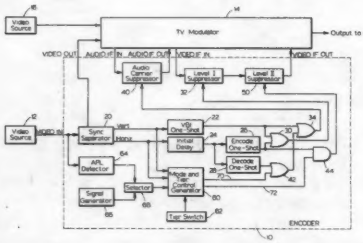
means for providing photographic displays of the first size matrix.

4,590,519

TELEVISION SIGNAL SCRAMBLING/DESCRAMBLING SYSTEM

Martin L. Zelenz, Manlius, N.Y., assignor to Regency Electronics, Inc., Indianapolis, Ind.

Filed May 4, 1983, Ser. No. 491,416
Int. Cl.[4] H04N 7/167
U.S. Cl. 358—120 **24 Claims**



23. A method for scrambling and descrambling television signals having horizontal and vertical synchronizing pulses, said method comprising the steps of: scrambling a composite television signal by suppressing the amplitude of the horizontal synchronization pulses at a first level of suppression and suppressing the level of the vertical synchronization pulses at a second level of suppression; and restoring synchronization pulses in the scrambled television signal by restoring the amplitude of the horizontal synchronization pulses from said first level of suppression and restoring the level of the vertical synchronization pulses from said second level of suppression.

4,590,520

METHOD AND APPARATUS FOR DETECTING AND FILLING-IN DEAD SPOTS OF VIDEO SIGNALS FROM AN IMAGE SENSOR

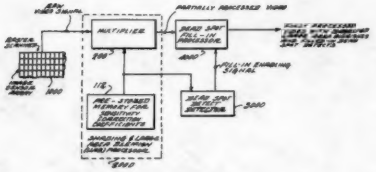
Wayne W. Frame, Longmont, and Robert E. Trumbull, Boulder, both of Colo., assignors to Ball Corporation, Muncie, Ind.

Filed Nov. 28, 1983, Ser. No. 555,509
Int. Cl.[4] H04N 5/14
U.S. Cl. 358—163 **19 Claims**

1. Apparatus for detecting and filling-in dead spots in a video signal generated by an array of photo-sensitive elements, said apparatus comprising:

a sensitivity compensating processor including a digital memory containing stored signals representing an array of pre-stored digital sensitivity correction coefficients corresponding to said array of photo-sensitive elements and sequentially accessed for use in making sensitivity corrections to the video signal generated by said elements;

a dead spot defect detector means connected to receive the sequentially accessed signals representing the correction coefficients stored in said digital memory and to produce a fill-in enabling signal based on detecting the leading and trailing edges of a dead spot by monitoring, in real time,



the succession of accessed coefficient values and by detecting the rate of change in the values of the received sequentially accessed correction coefficients; and

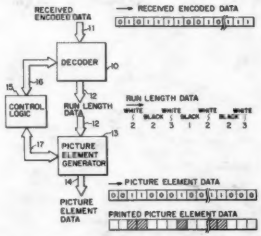
a dead spot fill-in processor connected to receive said video signal and to substitute thereinto a corrected video signal value which approximates the value that said video signal would have had absent a dead spot in response to said fill-in enabling signal.

4,590,521

PICTURE ELEMENT GENERATOR FOR FACSIMILE RECEIVER

Krishna Rallapalli, San Jose, and Shinkyo Kaku, Los Gatos, both of Calif., assignors to Advanced Micro Devices, Inc., Sunnyvale, Calif.

Filed Aug. 19, 1983, Ser. No. 524,957
Int. Cl.[4] H04N 1/40
U.S. Cl. 358—261 **13 Claims**



1. A facsimile circuit for generating picture element data from sequential color unit run length data comprising

first register means for receiving and holding said run length data of a first color unit,

second register means for holding said picture element data, said second register means releasing said picture element data as output when said data completely fills said register means,

third register means for holding run length data indicative of the picture element data in said second register means,

means coupled to said first and third register means for determining what portion of said first color unit may be loaded into said second register means,

fourth register means coupled to said determining means for holding run length data related to said color unit portion, and

means coupled to said fourth and second register means for decoding said fourth register means run length data into picture element data indicative of said color unit portion for loading into said second register means,

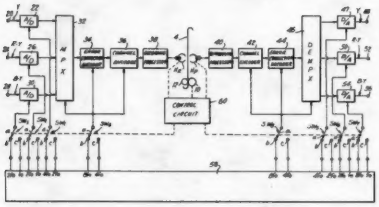
said first register means receiving and holding run length data of the next sequential color unit when said first color unit is completely decoded and loaded as picture element data.

4,590,522

APPARATUS FOR RECORDING AND REPRODUCING A DIGITAL INFORMATION SIGNAL WITH DIFFERENT SAMPLING FREQUENCIES

Sohei Takemoto, and Masato Nakamura, both of Kanagawa, Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Apr. 22, 1983, Ser. No. 487,770
Claims priority, application Japan, Apr. 23, 1982, 57-69429
Int. Cl.⁴ H04N *5/782*
U.S. Cl. 358—321 **16 Claims**



1. Apparatus for recording and reproducing an information signal on a record medium, comprising:

drive means for moving said record medium at selected speeds during a recording operation and a reproducing operation, respectively;

a recording section including;

recording converting means for converting an input information signal into a digital information signal having n digital signal components, $n \geqq 2$, each said digital signal component being converted at a respective component recording sampling frequency such that said digital information signal has a recording sampling frequency equal to the sum of the component recording sampling frequencies;

recording processing means for processing said digital information signal at a selected recording operating frequency; and

recording transducer means moveable at a selected speed for recording said processed digital information signal on said record medium as the latter is moved during said recording operation by said drive means;

a reproducing section including;

reproducing transducer means moveable at a selected speed for reproducing said processed digital information signal from said record medium as the latter is moved during said reproducing operation by said drive means;

reproducing processing means for processing said reproduced processed digital information signal at a selected reproducing operating frequency to produce a reproduced digital information signal having n reproduced digital signal components; and

reproducing converting means for converting said reproduced digital information signal from said reproducing processing means into analog form, said n reproduced digital signal components being converted at respective component reproducing sampling frequencies such that said reproduced digital information signal is converted at a reproducing sampling frequency equal to the sum of said component reproducing sampling frequencies; and

control means responsive to said recording sampling frequency to establish a value α, and responsive to said reproducing sampling frequency to establish a value β;

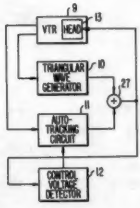
said control means selecting the speed of said recording transducer, the speed of said record medium and said recording operating frequency during said recording operation in proportion to said value α, and selecting the speed of said reproducing transducer, the speed of said record medium and said reproducing operating frequency during said reproducing operation in proportion to said value β.

4,590,523

CONTROL OF AUTO-TRACKING IN TRACKING-ERROR CORRECTING SYSTEM OF VIDEO RECORDING/REPRODUCING APPARATUS

Masahiro Honjo; Masao Tomita, both of Neyagawa, and Masaaki Kobayashi, Kawanishi, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Nov. 4, 1982, Ser. No. 439,712
Claims priority, application Japan, Nov. 9, 1981, 56-179474; Nov. 9, 1981, 56-179473
Int. Cl.⁴ H04N *5/78*
U.S. Cl. 360—10.3 **6 Claims**



1. A tracking-error correcting system in video recording/reproducing apparatus, comprising:

a head moving means for moving a reproducing head;

an auto-tracking means for generating a control signal for controlling said head moving means so that said reproducing head attains better tracking;

a triangular wave generating means for generating a triangular wave signal for correcting a difference of slant between a trace of said reproducing head and a recorded track;

an adder means for adding said control signal and said triangular wave signal and for supplying an added signal output to said head moving means, said added signal being the sum of said control signal and said triangular wave signal; and

a control voltage detecting means for detecting the level of said added signal and for allowing said auto-tracking means to operate only when said level of said added signal is within a predetermined range.

2. A tracking-error correcting system according to claim 1, wherein said control voltage detecting means comprises a low-pass filter coupled to said adding means for producing an average level of said added signal, and two comparators which have their outputs connected together for comparing said added signal with said average level of said added signal so as to thereby produce a signal for operating said auto-tracking means.

4,590,524

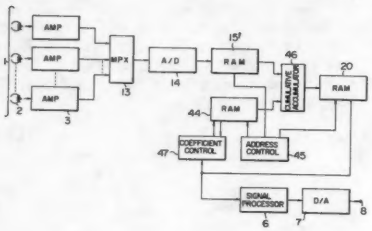
MULTITRACK PCM REPRODUCING APPARATUS

Hiroo Okamoto; Masaharu Kobayashi, both of Yokohama; Takashi Hoshino, Fujisawa, and Masami Nishida, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Nov. 18, 1983, Ser. No. 553,234
Claims priority, application Japan, Nov. 19, 1982, 57-201917; May 13, 1983, 58-82672
Int. Cl.⁴ G11B *15/14, 5/00*
U.S. Cl. 360—65 **7 Claims**

1. A multitrack PCM reproduced apparatus adapted for reproducing PCM signals recorded on a plurality of tracks in a distributed relation, comprising a signal selector means for

sequentially selecting the PCM signals reproduced from the individual tracks, an A/D converter for converting the reproduced signals selected by said signal selector means into digital signals, a memory for storing the digital signals obtained by the A/D conversion, a single digital filter for equalizing for each track the waveform of the digital signals stored in said memory, a PCM demodulator for demodulating the PCM signals on the basis of the digital signals processed by said digital filter, and wherein said digital filter includes a coefficient memory



for storing a plurality of predetermined coefficients, a control means for sequentially sampling the plural coefficients stored in said coefficient memory and the output of said memory for storing the digital signals according to a predetermined order, a means for multiplying the sampled digital signals by the coefficients and computing the sum of the plural products, and a coefficient control means for varying the coefficients stored in said coefficient memory to render the demodulated PCM signals to be optimum.

4,590,525

RECORDING BIAS OSCILLATING CIRCUIT

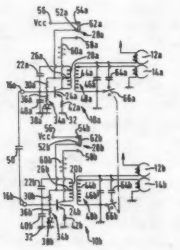
Yuji Komori, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Feb. 10, 1983, Ser. No. 465,632

Claims priority, application Japan, Feb. 12, 1982, 57-20807; Feb. 12, 1982, 57-20808; Feb. 12, 1982, 57-20819

Int. Cl.[4] G11B *5/47, 5/02*

U.S. Cl. 360—66 **14 Claims**



1. Recording bias oscillating circuit for an apparatus of the type having multiple independent tape recorder sections, said circuit comprising:

at least two independent recording heads respectively corresponding to said tape recorder sections for recording signals on tapes loaded on said tape recorder sections;

at least two independent bias oscillators for providing to said recording heads respectively bias signals with frequencies close to each other; and

means for coupling said bias oscillators to each other for synchronizing said frequencies,

wherein one of said bias oscillators has a synchronous signal output terminal and the other of said bias oscillators has a synchronous signal input terminal, and said coupling means is a capacitor connected between said synchronous output terminal and said synchronous signal input terminal.

4,590,526

METHOD AND APPARATUS FOR CONTROLLING HEAD MOVEMENT RELATIVE TO A DISK IN AN EMBEDDED SERVO SYSTEM

Richard G. Laatt; Thomas A. Fiers, and Thomas L. Andrews, Jr., all of Longmont, Colo., assignors to Amcodyne Incorporated, Longmont, Colo.

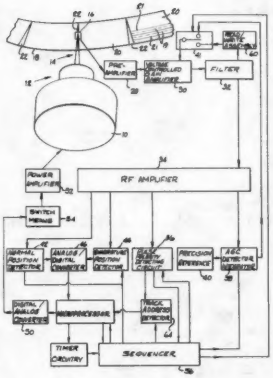
Filed Nov. 1, 1983, Ser. No. 547,308

Int. Cl.[4] G11B *5/55*

U.S. Cl. 360—78 **13 Claims**

MICROFICHE APPENDIX INCLUDED

(1 Microfiche, 21 Pages)



1. A method used in reaching a targated disk position during a seek operation, comprising:

providing a disk having a number of sectors for storing information and a number of servo fields having position information, said position information including information relating to addresses of tracks on said disk;

providing a transducer for movement relative to said disk;

obtaining information relating to a current track address by using said track address position information;

determining a Normal position magnitude and a Quadrature position magnitude using said position information;

finding a current position of said transducer relative to said disk using said Normal and Quadrature position magnitudes and said information relating to said current track address;

finding a distance value using said current position of said transducer relative to said disk; and

determining a velocity of said transducer using said distance value.

4,590,527

POSITIONING SERVOMECHANISMS

Nicholas M. Warner, Livermore, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Filed Nov. 14, 1983, Ser. No. 551,399

Int. Cl.[4] G11B *21/02*

U.S. Cl. 360—78 **9 Claims**

1. A servomechanism for positioning a head relatively to a rotary informational data storage medium, said servomechanism comprising;

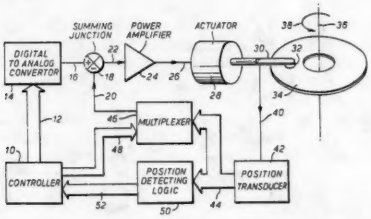
a controller,

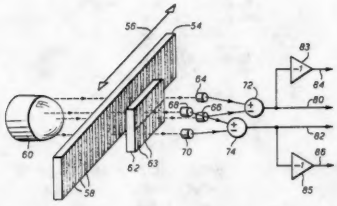
a position transducer mechanically coupled to said head and

operable to provide a plurality of cyclic, staggered, head position indicating signals,

a selector in receipt of said position-indicating signals and responsive to commands from said controller to select one of said position indicating signals as the feedback signal for said servomechanism to position said head in any selectable one of a plurality of rest positions,

a position detector in receipt of some or all of said position-indicating signals and operable to indicate to said controller when said head is in each of a plurality of test positions, each intermediate between a pair of said rest positions, and





a summing junction coupled to receive a position offset signal from said controller for moving said head from the selected one of said rest positions, where,

said controller is operable to select each of said position-indicating signals in turn as said feedback signal and to apply said offset signal and monitor said indication by said detector to determine in each case the amount of offset required to move said head from its selected rest position to the two adjacent test positions, and whereafter

said controller is operable to select said position-indicating signals and apply a corrective offset signal to apportion the total amount of offset so discovered among a plurality of equispaced operating positions.

4,590,528

MAGNETIC RECORDING AND/OR REPRODUCING APPARATUS OPERABLE WITH AN ADAPTER FOR A MINIATURE TYPE TAPE CASSETTE

Mitsuharu Tsuruoka, Kodaira, and Keiji Sasaki, Sagamihara, both of Japan, assignors to Victor Company of Japan, Ltd., Yokohama, Japan

Filed Apr. 18, 1984, Ser. No. 601,495

Claims priority, application Japan, Apr. 19, 1983, 58-68895; Apr. 20, 1983, 58-69707; Apr. 20, 1983, 58-69708; Jun. 7, 1983, 58-101527; Jun. 29, 1983, 58-117964

Int. Cl.[4] G11B *5/78, 15/66*

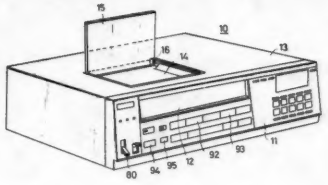
U.S. Cl. 360—94 **9 Claims**

1. A magnetic recording and/or reproducing apparatus for recording and/or reproducing a signal on and/or from a magnetic tape within a miniature type tape cassette which is smaller than a standard type tape cassette, when loaded with an adapter which has a shape approximately the same as the shape of said standard type tape cassette and accommodates therein said miniature type tape cassette, said recording and/or reproducing apparatus comprising:

an inserting opening through which said adapter is inserted;

an adapter housing for holding said adapter which is inserted through said inserting opening;

moving means for moving said adapter housing between a first position opposing said inserting opening and a second position where said adapter is loaded into said recording



and/or reproducing apparatus, through a predetermined position;

control means for controlling the operation of said moving means, said control means stopping said adapter housing at said predetermined position; and

an opening located at a position so as to enable access to said adapter housing in said predetermined position, said miniature type tape cassette being inserted into and removed from said adapter through said opening.

4,590,529

CARRIAGE DEVICE FOR MOVING AND POSITIONING MAGNETIC HEAD

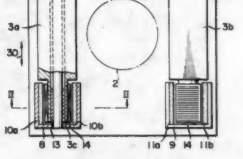
Akira Nikaido, Tokyo; Takayasu Machida; Yasuhisa Hirosawa, both of Saitama, and Fumio Nakajima, Tokyo, all of Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan

Filed Mar. 7, 1984, Ser. No. 587,272

Claims priority, application Japan, Mar. 8, 1983, 58-36662

Int. Cl.[4] G11B *21/08;* **H02K** *41/00*

U.S. Cl. 360—106 **3 Claims**



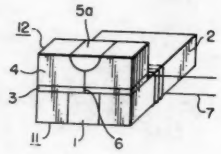
1. A carriage device for moving and positioning a magnetic head opposite a prescribed track of a magnetic disk, comprising guide rails formed at least partly of a magnetic substance and secured to a base plate, a carriage having mounted thereon a magnetic head and being slidably supported on said guide rails, coils forming part of said carriage and disposed around the portions of the guide rails made of a magnetic substance, magnetic yokes magnetically linked with said magnetic portions of the guide rail and secured to said base plate, and permanent magnets secured to said magnetic yokes and opposed across a gap to said coils.

4,590,530

MAGNETIC HEAD

Hiroshi Sakakima; Mitsuo Satomi, both of Hirakata; Yukihiro Yanagiuchi, Katano, and Harufumi Senno, Yamatokooriyama, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Kadoma, Japan

Filed Nov. 24, 1982, Ser. No. 444,455
Claims priority, application Japan, Nov. 24, 1981, 56-188672
Int. Cl.[4] G11B *5/221, 5/14*
U.S. Cl. 360—122 9 Claims



1. A magnetic head comprising:

a front core having a wear-resistant non-magnetic base and a soft magnetic thin film on said base, said thin film being in two parts and having a magnetic gap therebetween;

a back core having a U-shaped block of soft magnetic material having magnetic characteristics inferior to those of said thin film and wear resistance characteristics superior to those of said thin film, and a wear-resistant non-magnetic member mounted between the ends of the leg portions of said block, said front core being against the lateral face of said back core adjacent the ends of said legs and having said thin film sandwiched between said back core and said non-magnetic base, the ends of said legs, said non-magnetic member, the edge of said thin film and the side face of said non-magnetic base forming a tape contact face, said magnetic gap facing said wear-resistant non-magnetic member on said back core, said soft magnetic thin film and said soft magnetic block being in face-to-face contact with each other out of the neighborhood of said magnetic gap for forming a closed magnetic path across said magnetic gap; and

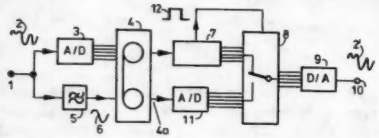
a winding on said block.

4,590,531

SYSTEM FOR COMPENSATING SIGNAL INTERFERENCE IN A PCM AUDIO TRANSMISSION

Hans-Joachim Platte, Hemmingen; Walter Voessing, Wennigsen; Günter Oberjatzas, and Ernst Schröder, both of Hanover, all of Fed. Rep. of Germany, assignors to Telefunken Fernseh und Rundfunk GmbH, Hanover, Fed. Rep. of Germany

Filed Aug. 16, 1984, Ser. No. 641,256
Claims priority, application Fed. Rep. of Germany, Aug. 17, 1983, 3329601
Int. Cl.[4] G11B *5/09*
U.S. Cl. 360—47 10 Claims



1. A pulse code modulated audio signal transmission system which compensates for signal interference in the pulse code modulated audio signal comprising:

first means for receiving an audio signal and for converting the audio signal into a pulse code modulated audio signal;

second means, including a low pass filter, for receiving the audio signal and for producing an auxiliary signal corresponding to the audio signal but having a smaller bandwidth than the audio signal; and

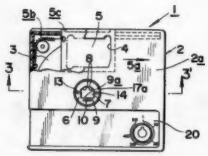
transmission means connected to said first and second means for receiving the pulse code modulated audio signal and the auxiliary signal, said transmission means including means for converting the auxiliary signal into a DPCM auxiliary signal, said transmission means producing an output signal which comprises the audio signal with portions of the audio signal which contain interference being substituted with corresponding portions of the DPCM auxiliary signal.

4,590,532

MAGNETIC DISK ASSEMBLY CARTRIDGE FOR SAME AND RECORDING/REPRODUCING APPARATUS FOR USE WITH SAME

Etsuro Saito, Ayase, Japan, assignor to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 383,208, May 28, 1982, abandoned.
This application Jan. 9, 1985, Ser. No. 689,515
Claims priority, application Japan, Jun. 5, 1981, 56-82831[U]
Int. Cl.[4] G11B *23/03, 5/012, 5/016, 3/70*
U.S. Cl. 360—133 21 Claims



1. A magnetic disk assembly comprising a magnetic disk and a hub member centrally positioned on said magnetic disk having a non-circular opening for receiving a circular drive shaft to rotatably drive said magnetic disk, said hub member including means defining at least two flat, relatively immovable reference surfaces which converge toward each other and which form two respective walls of said opening, and resilient means integral with said means defining the reference surfaces and having a surface which forms a third wall of said opening, said three walls being positioned and dimensioned such that, when a circular drive shaft is received in said opening, said reference surfaces and the surface of said resilient means all tangentially contact said drive shaft and said resilient means acts on the drive shaft in the direction in which said flat reference surfaces converge so as to rotate the disk assembly when said drive shaft rotates.

4,590,533

OVERVOLTAGE PROTECTIVE RELAY DEVICE

Masanori Murata, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Jul. 22, 1983, Ser. No. 516,342
Claims priority, application Japan, Jul. 24, 1982, 57-130026
Int. Cl.[4] H02H *7/04, 3/20*
U.S. Cl. 361—91 8 Claims

1. An overvoltage protective relay device for protecting a power apparatus in an electric power system from an overvoltage, comprising:

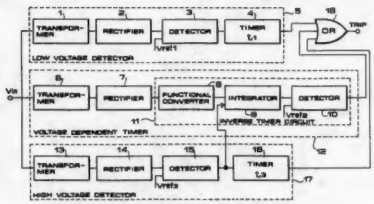
means for converting a voltage applied to said power apparatus into a DC signal;

first and second detector means for generating detection signals respectively when the peak level of said DC signal reaches overvoltages exceeding predetermined first and second reference voltages;

first and second timer means for generating signals when the detection signals from said first and second detector means are respectively maintained in a high-level for first

and second predetermined time periods which are selected to be different from each other;

third timer means comprising voltage level converter means responsive to said DC signal in accordance with a predetermined response function, integrator means for integrating the output of said level converter means, and third detector means for detecting the peak level of the output



of said integrator means, and generating a signal when the integrated output of said integrator means exceeds a predetermined third reference voltage which is selected to fall between said first and second reference voltages; and

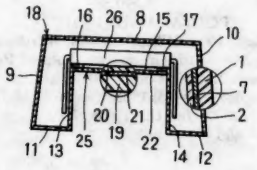
logic means for allowing to pass at least one of the output signals of said first, second and third timer means as a signal for disconnecting said power apparatus from the overvoltage.

4,590,534

TUBES FOR INTEGRATED CIRCUITS

Yoshihiro Akamatsu, Tokyo; Tadashi Azuma, Kanagawa, and Toshio Ishida, Tokyo, all of Japan, assignors to Fujimori Kogyo Co., Ltd., Japan

Filed Feb. 28, 1985, Ser. No. 706,668
Claims priority, application Japan, Aug. 27, 1984, 59-128583
Int. Cl.⁴ H05F 3/00
U.S. Cl. 361—212 **15 Claims**



1. A tube for integrated circuits, which comprises:

an electrically conductive substrate sheet formed by laminating an electrically conductive thin layer onto at least one side of a transparent sheet of a synthetic resin, said substrate sheet being bent plural times in a parallel fashion to thereby form an upper section, left and right sections depending therefrom, left and right bottom sections and left and right upright sections spaced away from each other;

a covering member formed of left and right resting pieces for resting an integrated circuit thereon; and

an electrically conductive band-like lining sheet formed by laminating an electrically conductive thin layer onto at least one side of a transparent band-like sheet of a synthetic resin;

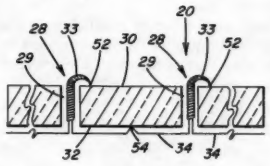
said lining sheet being fixedly bonded at both side edges to the lower faces of said resting pieces.

4,590,535

STATIC CHARGE DISSIPATION CIRCUIT WITH ELECTROCONDUCTIVE WICKS

Raymond L. Mang, Huntsville, Ala., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Feb. 4, 1983, Ser. No. 464,088
Int. Cl.⁴ H05F 3/02
U.S. Cl. 361—218 **15 Claims**



1. A device for dissipating static charge comprising:

a substrate having a first surface and a second opposite surface;

a plurality of electroconductive members mounted in said substrate for electrically interconnecting said first surface and said second surface, each of said members defined by at least two electroconductive filaments between said first and second surfaces of said substrate and having an end portion adjacent said second surface; and

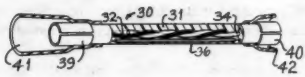
a plurality of electroconductive wires electrically connecting said end portions of selected members to one another to form a plurality of individual electroconductive member and electroconductive wire assemblies, said wires having a first end and a second end wherein said first end is to be grounded.

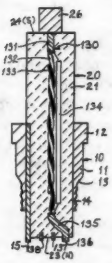
4,590,536

RESISTIVE-CAPACITIVE IGNITER AND CABLE

Martin E. Gerry, 13452 Winthrope St., Santa Ana, Calif. 92705

Filed Jun. 20, 1985, Ser. No. 747,039
Int. Cl.⁴ H01T 13/05
U.S. Cl. 361—253 **24 Claims**





1. A transmission cable for passing ignition current in an ignition system, said cable having a body comprising electrical insulation, characterized by:

capacitive means, embedded in said electrical insulation, for passing a portion of said ignition current; and

resistive means, embedded in said electrical insulation and connected in parallel with said capacitive means, for passing another portion of said ignition current, said capacitive and resistive means having parameter values such as to develop first order poles with only real parts in the complex plane defining said ignition current.

7. An igniter for a fuel burning engine, said igniter having an electrical insulator and an electrodestructure substantially at the center of the insulator, characterized by:

a resistor; and

a capacitor, connected in parallel with the resistor, said resistor and capacitor being embedded in said insulator and forming part of the electrode stucture.

4,590,537

LAMINATED CAPACITOR OF FEED-THROUGH TYPE

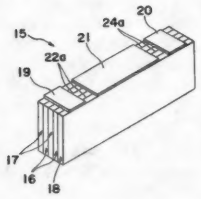
Yukio Sakamoto, Fukui, Japan, assignor to Murata Manufacturing Co., Ltd., Japan

Filed Sep. 6, 1984, Ser. No. 647,646

Claims priority, application Japan, Sep. 11, 1983, 58-140846[U]

Int. Cl.⁴ H01G *1/14*

U.S. Cl. 361—306 **6 Claims**



1. A laminated capacitor of a feed-through type for filtering unwanted signals and transmitting wanted signals, comprising:

a plurality of dielecric sheets laminated one over the other and defining a laminated block having at least a first plane surface where the sides of the laminated sheets are aligned;

a plurality of center electrodes, each provided between neighboring dielectric sheets such that the rim of the center electrode is spaced from the rim of the sheet;

first extending electrodes extending from each of every other center electrode and terminating at said first plane surface;

second extending electrodes extending from each of the same center electrodes as those from which the first extending electrodes extend, and terminating at said first plane surface, said above-mentioned center electrodes, said first extending electrodes, and said second extending electrodes providing a path for such wanted signals;

third extending electrodes extending from each of the remaining center electrodes and terminating at said first plane surface;

a first external electrode provided on said first plane surface and electrically connected to said first extending electrodes;

a second external electrode provided on said first plane surface and electrically connected to said second extending electrodes; and

a third external electrode provided on said first plane surface and electrically connected to said third extending electrodes.

4,590,538

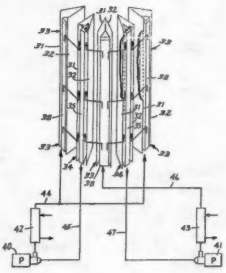
IMMERSION COOLED HIGH DENSITY ELECTRONIC ASSEMBLY

Seymour R. Cray, Jr., Chippewa Falls, Wis., assignor to Cray Research, Inc., Chippewa Falls, Wis.

Filed Nov. 18, 1982, Ser. No. 442,569

Int. Cl.⁴ H05K *7/20*

U.S. Cl. 361—385 **17 Claims**



1. A liquid immersion cooled electronic assembly, comprising:

a liquid coolant container;

a plurality of stacks of spaced circuit boards;

means positioning said stacks within said liquid coolant container adjacent one another and spaced apart, the spaces between said stacks forming coolant columns; and

means for supplying a flow of coolant to some of said columns adjacent said stacks and means for removing coolant from others of said columns, said means for supplying coolant and said means for removing coolant connected respectively to alternate columns, said columns to which coolant is supplied and columns from which coolant is removed being on opposite sides of stacks so that coolant supplied on one side of a stack flows between said spaced circuit boards therein to the other side thereof where it is removed to thereby establish coolant circulation across said circuit boards to cool circuit components thereon.

4,590,539

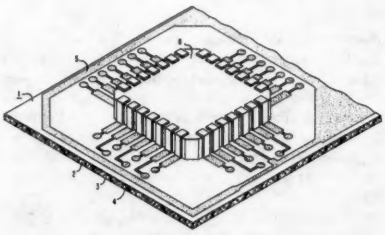
POLYARAMID LAMINATE

Zal N. Sanjana, Penn Hills Township, Allegheny County, and Joseph R. Marchetti, Greensburg, both of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed May 15, 1985, Ser. No. 734,371

Int. Cl.⁴ H05K *7/02*

U.S. Cl. 361—400 **19 Claims**



1. A composite comprising

(A) polyaramid woven fabric; and

(B) a resin which comprises

(1) water;

(2) a water-based emulsion of an epoxy selected from the

group consisting of diglycidyl ethers of bisphenol A, diglycidyl ethers of bisphenol F, novolacs, and mixtures thereof;

(3) a water-compatible, curing agent for said emulsion; and

(4) a water-compatible catalyst for said emulsion.

4,590,540

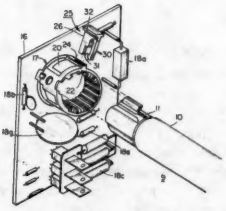
CIRCUIT BOARD MOUNTING ARRANGEMENT

John E. Nicholson, Indianapolis, Ind., and William A. Gilbert, Hialeah, Fla., assignors to RCA Corporation, Princeton, N.J.

Filed May 10, 1984, Ser. No. 609,415

Int. Cl.[4] H05K *1/18*

U.S. Cl. 361—400 **6 Claims**



2. A mounting arrangement for a circuit board on a cathode ray tube, comprising:

a cathode ray tube including a neck portion having a tube base mounted to said neck portion and incorporating a guide member extending parallel to the longitudinal axis of said cathode ray tube from a point adjacent the end of said tube base remote from said neck portion to a point intermediate the two ends of said tube base, the surface of said guide member at said intermediate point extending substantially perpendicular to said longitudinal axis;

a socket, mounted on said circuit board, incorporating a generally cylindrical wall structure having inner and outer wall surfaces, a portion of said wall structure forming a channel therein for receiving said guide member to permit alignment of said socket on said tube base, said portion of said wall structure having a passage extending between said inner and outer wall surfaces; and

locking means inserted through said passage in the wall structure of said socket for abutting said surface of said guide member to prevent removal of said socket from said tube base.

4,590,541

ORGANIC SEMICONDUCTOR COMPOSITIONS AND SOLID ELECTROLYTIC CAPACITOR USING THE SAME

Shozo Takahashi, Kawasaki; Susumu Yoshimura, Tokyo, and Junji Ozaki, Kyoto, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Japan

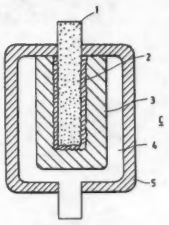
Filed Apr. 5, 1985, Ser. No. 720,304

Claims priority, application Japan, Apr. 6, 1984, 59-69340; Apr. 6, 1984, 59-69339; Apr. 6, 1984, 59-69338; Jun. 1, 1984, 59-113331; Jun. 1, 1984, 59-113326

Int. Cl.[4] H01G *9/05*

U.S. Cl. 361—433 **37 Claims**

1. An organic semiconductive composition comprising a CN group-bearing organic semiconductive ion radical salt, and a polyhydric alcohol used in an amount of 5 to 60 wt% of said ion radical salt whereby a toxic gas evolved from said ion



radical salt, when said salt is excessively heated, is reduced to a substantial extent by the action of said polyhydric alcohol.

4,590,542

HEADLIGHT FOR MOTOR VEHICLE

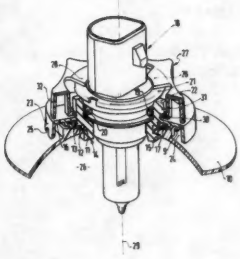
Frieder Schauwecker, Pfullingen, and Walter Weber, Weil der Stadt, both of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Mar. 18, 1985, Ser. No. 713,262

Claims priority, application Fed. Rep. of Germany, Jul. 10, 1984, 3425291

Int. Cl.[4] H01R *33/46;* **F21M** *3/00*

U.S. Cl. 362—61 **15 Claims**



1. A headlight for a vehicle, particularly a motor vehicle, comprising a reflector made of thermosetting plastics and having an apex opening; a bulb having an axis and including a socket disc; a clamping ring for clamping of said bulb in said reflector; a bulb holder of non-thermosetting material and receiving said bulb, said bulb holder being received in said opening, first bayonet lock means having opposed planar surfaces coacting along a plane substantially perpendicular to said axis for connecting said bulb holder to said reflector; and second bayonet lock means having opposed planar surfaces coacting along a plane substantially perpendicular to said axis for connecting said clamping ring to said bulb holder, said socket disc of the bulb being interposed between and in direct contact with said clamping ring and said bulb holder.

4,590,543

TRILIGHT

Grand Chen, Ban-Chiau, Taiwan, assignor to Silver River Electronic Co., Ltd., Taiwan

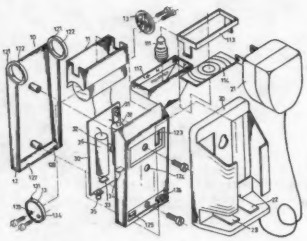
Filed Nov. 5, 1984, Ser. No. 668,153

Int. Cl.[4] F21L *7/00*

U.S. Cl. 362—183 **3 Claims**

1. A trilight operable as a night light, an emergency light and a spotlight, comprising a case consisting of a body and a head

pivoted together by two pivots, a separable wall holder having a rectifier and contact springs, a circuit board and a spotlight, the case having two ring pivot bearings with inside grooves, the circuit board consisting of three diodes, two LEDs, seven resistors, three transistors, two rechargeable batteries, one reed relay, one CDS, one bulb, one switch having a first position, a



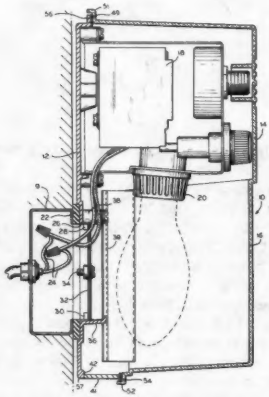
second position and a third position, and two pins for connecting to said contact springs of the wall holder to form a circuit so that the trilight will operate as a night light and an emergency light when said switch is set in said first position, so that the trilight will operate as a spot light when said switch is set in said second position, and so that said batteries will only be charged when said switch is set in said third position.

4,590,544

LIGHTING FIXTURE WITH CONDUIT ADAPTABLE WIRE COVER

Giovanni Decandia, Germantown, Tenn., assignor to FL Industries, Inc., Livingston, N.J.

Filed Sep. 24, 1984, Ser. No. 653,134
Int. Cl.[4] F21S *1/02*
U.S. Cl. 362—368 **12 Claims**



2. A lighting fixture comprising:

a rear housing having an opening adapted to receive electrical wires into said fixture and a raised boss in said opening having a front surface and a rear surface;

a reflector mounted to said rear housing;

a cover adapted to be selectively mounted to either said front surface or said rear surface of said boss to cover said opening in said rear housing; and

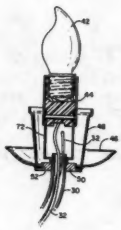
a front housing in engagement with said rear housing.

4,590,545

LIGHT FIXTURE

Raymond D. Scheer, 9711 N. Hollybrook Lake Dr., Pembroke Pines, Fla. 33025

Filed Aug. 29, 1984, Ser. No. 645,244
Int. Cl.[4] F21P *1/02*
U.S. Cl. 362—392 **6 Claims**



1. A light fixture, comprising:

a tubular support enclosing an electric wire for carrying current to a light bulb, the light bulb to be mounted in a socket at a free end of the support, the support having means to engage the socket at said free end;

a connecting flange attached to the tubular support adjacent the free end, the flange being wider than the socket, the flange having a stepwise increase in diameter forming a shoulder, a smaller portion of said connecting flange being threaded and a larger portion defining a stop;

a cover cup mounted to at least partly surround the socket, the cup having an opening in the bottom thereof dimensioned to fit over the socket and engage the connecting flange; and,

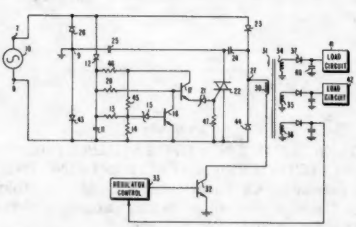
at least one additional cup having an opening in a bottom thereof, said opening in the bottom of the additional cup being larger than the threaded portion of the connecting flange, the additional cup being held between said cover cup and the stop, whereby the cover cup and the additional cup can be mounted and removed without disturbing the light bulb socket.

4,590,546

VARIABLE INPUT VOLTAGE REGULATOR CIRCUIT

Donald W. Maile, Lancaster, Pa., assignor to RCA Corporation, Princeton, N.J.

Filed Feb. 23, 1984, Ser. No. 582,685
Int. Cl.[4] H02M *7/19*
U.S. Cl. 363—37 **5 Claims**



1. A power supply comprising:

a source of unregulated AC voltage having an amplitude between a first and a second level;

means for providing a voltage level representative of the amplitude of said unregulated AC voltage;

means responsive to said representative voltage level for producing an output signal when said representative volt-

age level is above a predetermined level corresponding to an unregulated AC voltage amplitude intermediate said first and second levels;

first rectifying means coupled to said unregulated AC voltage source for producing a first DC voltage from said AC voltage;

circuit means for forming a second rectifying means for producing a second DC voltage from said AC voltage when said circuit means is coupled to said first rectifying means;

switch means responsive to said output signal for coupling said circuit means to said first rectifying means when said unregulated AC voltage level is above said intermediate level comprising:

a bidirectional switch coupled to said first rectifying means and to said circuit means;

a first transistor coupled to said output signal producing means; and

a second transistor, regeneratively coupled to said first transistor and to said bidirectional switch, said first and second transistors cooperating to provide rapid switching of said bidirectional switch; and

regulator means responsive to said first or second DC voltage for providing a DC output voltage having a fixed regulated level with respect to variations in the level of said unregulated AC voltage between said first and second levels.

4,590,547

ACTIVE FULL-WAVE RECTIFIER DETECTOR CIRCUIT

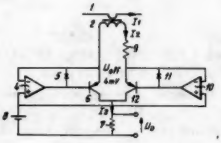
Ynze D. Goinga, Borne, Netherlands, assignor to Hazemeijer B.V., Hengelo, Netherlands

Filed Sep. 27, 1984, Ser. No. 654,954

Claims priority, application Netherlands, Sep. 28, 1983, 8303319

Int. Cl.[4] H02M *7/217*

U.S. Cl. 363—127 **4 Claims**



1. An active full-wave rectifier detector circuit, comprising:

first and second operational amplifiers each having an inverting input-connected to respective terminals of a secondary winding of a current transformer, with the inverting input of said second operational amplifier including a resistance, the non-inverting input of each of said operational amplifiers being connected to a reference voltage;

first and second trasistors of the same conductivity type each having a base electrode connected to a respective output of said first and second operational amplifiers, one of the remaining electrodes of each said first and second transistor connected to the inverting input of a respective one of said first and second operational amplifiers, and the remaining electrode of each of said first and second transistors being commonly connected;

a rectifying element being connected between the inverting input and output of each said first and second operational amplifiers;

a resistance connected in the common connection of said first and second transistors to provide an output signal; and

said reference voltage being greater than the maximum output signal.

4,590,548

A.C. SUPPLY CONVERTER

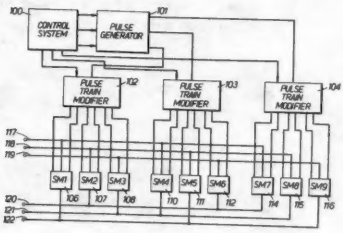
Michael J. Maytum, Willington, England, assignor to Texas Instruments Incorporated, Dallas, Tex.

Filed Apr. 6, 1984, Ser. No. 597,787

Claims priority, application United Kingdom, Apr. 6, 1983, 8309303

Int. Cl.[4] H02M *5/257*

U.S. Cl. 363—161 **13 Claims**



1. A direct a.c. converter having N input conductors for an N-phase a.c. input voltage system, where N is an odd integer greater than 2, one or more output conductors for carrying respective phases of an a.c. output voltage system having at least one characteristic such as frequency, amplitude, phase angle or phase displacement which is different from that of the input voltage system, a plurality of bidirectional switches which individually connect each input conductor to the or each output conductor, and a control system including timing means which produces for the or each output conductor a repeating sequence of mutually abutting width modulated pulses, there being N pulses in the sequence respectively allocated to the phases of the input voltage system, the control system being connected to the switches so that the pulses cause the switches to be closed in such a way that each phase of the input voltage system is connected in turn to the or each phase of the output voltage system and that at any given instant only one of the switches connected to the or each output conductor is closed, wherein the width modulation of the pulses includes a component at the N^{th} harmonic of the input voltage frequency which is of such an amplitude and so phased as to permit the amplitude of the output voltage system to be larger than the minimum instantaneous voltage of the input voltage system.

4,590,549

CONTROL SYSTEM PRIMARILY RESPONSIVE TO SIGNALS FROM DIGITAL COMPUTERS

Robert G. Burrage, Solihull; Stanley G. Glaze, Kingswinford, and James Tipton, Solihull, all of England, assignors to Lucas Industries, England

Filed May 27, 1983, Ser. No. 498,860

Claims priority, application United Kingdom, Jun. 3, 1982, 8216234

Int. Cl.[4] G05B *15/08, 9/02;* **G06F** *7/02;* **H04L** *1/00*

U.S. Cl. 364—131 **7 Claims**

1. A control system which is primarily controlled by a digital computer, said system comprising:

(a) an apparatus responsive to input control signals,

(b) and a computer arrangement comprising:

(1) first and second digital computers which have different hardware designs and which are programmed with respective first and second control programs which in turn are repsonsive to operating conditions of said apparatus for providing first and second substantially identical output signals;

(2) a third computer responsive to selected ones of said operating conditions for providing third output signals;

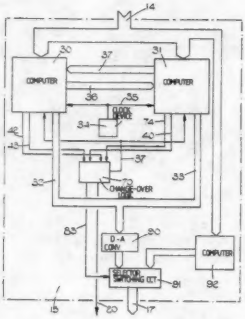
(3) switching means for causing said input control signals

to be supplied either by said first and second output signals or by said third output signals;

(4) said second and first computers also being programmed with respective first and second limiter programs which:

(A) generate limiting values for said first and second output signals respectively,

(B) and provide first and second output indicating signals if either of said first and second output signals exceeds its respective limiting value by more than a predetermined amount;



(5) said switching means being responsive to said first or said second indicating signals for causing said third output signals to supply said input control signals;

(6) and a timer device for generating time signals for controlling operation of the first and second computers so that said first control program and said first limiter program operate concurrently, and said second control program and said second limiter program operate concurrently, and said first programs are alternated with said second programs.

4,590,550

INTERNALLY DISTRIBUTED MONITORING SYSTEM

John H. Eilert, Wappingers Falls; Arthur L. Levin, Pleasant Valley, and Thomas Julian, Poughkeepsie, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Jun. 29, 1983, Ser. No. 509,128
Int. Cl.[4] G06F *11/34*
U.S. Cl. 364—200 **21 Claims**

1. Internal system instrumentation monitoring means for obtaining measurement data on the software/hardware operation of a data processing system having at least one CPU, a channel processor for controlling I/O of the system, and a main storage controller for controlling system main storage, the CPU having an instruction execution unit with an instruction address register for indicating the address of each instruction executed by the CPU, the monitoring means comprising:

an instrumentation table unit (ITU) being embedded internally within the CPU in local proximity to CPU signals which may be monitored,

the ITU having an instrumentation table array (ITA) that includes a plurality of entries, each entry being capable of storing an input signal to the ITA while the entry is being addressed,

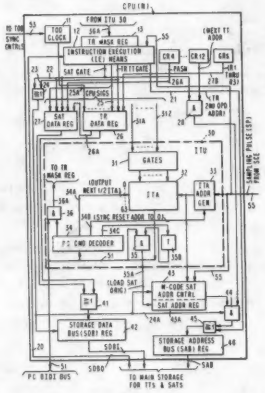
means for connecting a selected set of internal CPU signal lines as input signals to the ITA,

addressing means for selecting a current entry in the ITA and for enabling the current entry to receive and record a current state of the input signals to the ITA,

sampling signal means connected to the addressing means for providing sampling signals to the addressing means to increment the address to a next entry in the ITA so that the next entry can then receive the input signals,

means for the input signals to the previously addressed entry when the sampling signal increments the address to the next entry in the ITA,

wherein a collection of stored input signal states in an entry being determined by the timing of the sampling signal that disables the input signals to the entry, a previously addressed entry receiving input signals thereby becomes a ITA collected entry of stored input signals upon having its input signals disabled,



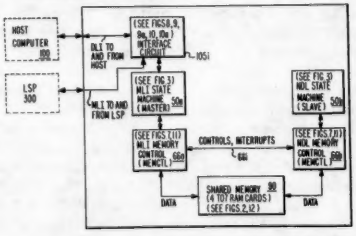
instrumentation control means connected to the ITU to control when the ITU is active for recording the input signals in the ITA, in order to enable the ITA to record a statistically significant number of entries during a period of ITU measurement activity.

4,590,551

MEMORY CONTROL CIRCUIT FOR SUBSYSTEM CONTROLLER

Ronald D. Mathews, Mission Viejo, Calif., assignor to Burroughs Corporation, Detroit, Mich.

Continuation of Ser. No. 295,588, Aug. 24, 1981, abandoned.
This application May 7, 1984, Ser. No. 608,272
Int. Cl.[4] G06F *13/14*
U.S. Cl. 364—200 **3 Claims**


NSP Card Level Block Diagram.
HOST COMPUTER 890
LSP 300
DLE TO AND FROM HOST
NLI TO AND FROM LSP
(SEE FIGS 8, 9, 10, 10a) INTERFACE CIRCUIT 1051
(SEE FIG 3) NLI STATE MACHINE (MASTER) 50m
(SEE FIG 3) NDL STATE MACHINE (SLAVE) 50n
(SEE FIGS 1(1)) NLI MEMORY CONTROL (MEMCTL) 66a
(SEE FIGS 7(1)) NDL MEMORY CONTROL (MEMCTL) 66b
CONTROLS, INTERRUPTS
66c
DATA
SHARED MEMORY 90 (4 TO 7 RAM CARDS) (SEE FIGS 2, 12)
DATA

1. In a data transfer network which provides I/O control operations for data being transferred between one or more main host computers and one or more peripheral terminal units wherein one of said main host computers and a said peripheral terminal unit use different protocols and message formatting, and wherein any one of said main host computers or any one of said peripheral terminal units may operate as a source terminal

of unprocessed message data or as a destination terminal for processed message data, and wherein said transfer network includes a first master processor means and a second slave processor means which communicate to a shared memory storage means, and wherein said first master processor means operates to transfer message data between said shared memory storage means and said main host computer or said peripheral terminal unit, and said second slave processor means operates to translate and format message data placed in said shared memory means from a source terminal and to process said message data to make said message data compatible for the said destination terminal, a shared memory control system whereby said first master and said second slave processor means access instruction data and message data from, and also place instruction and message data into said shared memory storage means, said shared memory control system comprising:

(a) said first master processor means functioning to communicate with a selected main host computer and/or a selected peripheral terminal unit for enabling message data transfer between said source terminal and said destination terminal through a shared memory storage means, and wherein said first master processor means includes:

(a1) a master processor for executing data transfer operations requested by said source terminal and including:

(a1a) means to transmit interrupt signals to a slave processor;

(a2) means to place instruction data and unprocessed message data into said shared memory means for retrieval and processing by said second slave processor means;

(a3) module select logic means, connected to receive shared memory address request data from said master processor and from said second slave processor means, said module select logic means operatively controlling priority of access to said shared memory storage means whenever simultaneous requests for access to the same memory address occur from said master processor and said slave processor means;

(a4) a master memory control unit for servicing shared memory address requests from said master processor, said master memory control unit including:

(a4a) means for executing transfers of unprocessed message data from said source terminal to said shared memory means;

(a4b) means for executing transfers of processed message data from said shared memory means to said master processor for transmittal to a destination terminal;

(b) said second slave processor means functioning to process said unprocessed message data residing in said shared memory storage means in order to translate, format, and arrange protocol messages in order that said unprocessed message data placed in said shared memory storage means are made compatible for reception by said destination terminal, said second slave processor means including:

(b1) a slave processor for processing unprocessed message data from said source terminal into processed data compatible with said destination terminal, and including:

(b1a) means to retrieve and to execute instruction data from said shared memory means wherein said instruction data has been solely originated from said first master processor means;

(b2) a slave memory control unit including:

(b2a) means to retrieve said unprocessed message data from said shared memory means for transmittal to said slave processor for processing into processed data compatible with said destination terminal;

(b2b) means to place said processed data from said slave processor into said shared memory means for retrieval by said first master processor means;

(c) said shared memory storage means having first and second multiple bus means to said master and said slave memory control units, said shared memory storage means including:

(c1) a first set of memory locations for holding first program instruction data for said first master processor means;

(c2) a second set of memory locations for holding second program instruction data for said second slave processor means;

(c3) a third set of memory locations for holding unprocessed and processed message data;

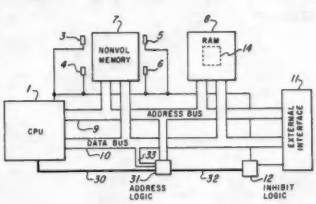
(c4) a fourth set of memory locations for holding information data to be transmitted between said first master processor means and said second slave processor means, wherein said information data is retrievable by both said master and said slave processor means in order to inform each other of the status of operations being executed and as to the memory location of unprocessed and processed message data.

4,590,552

SECURITY BIT FOR DESIGNATING THE SECURITY STATUS OF INFORMATION STORED IN A NONVOLATILE MEMORY

Karl M. Guttag, Houston, and Steve Nussrallah, Richardson, both of Tex., assignors to Texas Instruments Incorporated, Dallas, Tex.

Filed Jun. 30, 1982, Ser. No. 393,954
Int. Cl.[4] G06F *12/14*
U.S. Cl. 364—200 **10 Claims**



1. A digital processing device implemented on a single semiconductor substrate comprising:

a nonvolatile memory means for storing data and instructions that define data processing operations;

an information transfer means for transferring data and instructions;

a first inhibit logic means connected between said nonvolatile memory means and said information transfer means for selectively inhibiting transfer of data and instructions from said nonvolatile memory means to said information transfer means;

a central processing unit connected to said information transfer means for performing data processing operations defined by instructions received from said information transfer means;

at least one security bit register connected to said central processing unit, each security bit register having a state indicating a protected or nonprotected status of a corresponding portion of said nonvolatile memory means;

an external interface means connected to said information transfer means for transfer of data and instructions between said digital processing device and at least one external device;

an external interface inhibit logic means connected to said external interface means for selectively inhibiting transfer of data and instructions by said external interface means;

an instruction acquisition means connected to said information transfer means for indicating when data or instructions within said nonvolatile memory means are being accessed; and

a security control means connected to said information transfer means, said first inhibit logic means, said external

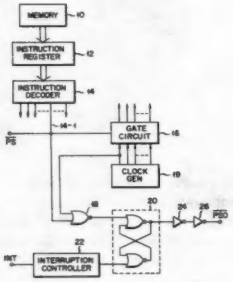
interface inhibit logic means, said at least one security bit register and said central processing unit for determining when an instruction is being fetched and further connected to said instruction acquisition logic to indicate when a protected status portion of said nonvolatile memory means is being accessed and for selectively causing said first inhibit logic means and said external interface inhibit logic means to inhibit data and instruction transfer upon performance of selected operations by said central processing unit, thereby preventing unauthorized access to data and instructions stored in said protected, status portion of said nonvolatile memory means.

4,590,553

MICROCOMPUTER WITH POWER-SAVE OUTPUT INSTRUCTIONS

Makoto Noda, Yokohama, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Jan. 5, 1983, Ser. No. 455,794
Claims priority, application Japan, Jan. 25, 1982, 57-9663
Int. Cl.[4] G06F *1/04*
U.S. Cl. 364—200 **4 Claims**



1. A microcomputer having an operation state and a power-save state, said microcomputer being responsive to a power-save instruction to reduce its own power consumption by entering said power-save state, and being responsive to an externally-supplied interruption signal to return to an operation state from said power-save state, said microcomputer comprising:

a memory for storing instructions, including said power-save instruction, for execution by said microcomputer;

an instruction decoded coupled to said memory for generating a power-save signal corresponding to said power-save instruction;

a flip-flop circuit for providing a power-save output signal, said flip-flop having a set terminal coupled to the power-save signal of the instruction decoder and a reset terminal coupled to said externally-supplied interruption signal;

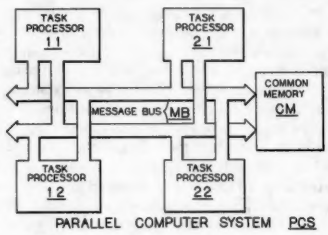
a clock generator for supplying clock signals to said microcomputer, said clock generator including means for receiving said power-save signal from the instruction decoder and turning off said clock signals in response to said power-save instruction; and input means connected to said set terminal of said flip-flop for an externally supplied power-save signal.

4,590,554

BACKUP FAULT TOLERANT COMPUTER SYSTEM

Sam D. Glazer, New York; James Baumbach, Brooklyn; Anita Borg, New York, all of N.Y., and Emanuel Wittels, Englewood Cliffs, N.J., assignors to Parallel Computers Systems, Inc., Fort Lee, N.J.

Filed Nov. 23, 1982, Ser. No. 443,937
Int. Cl.[4] G06F *15/16*
U.S. Cl. 364—200 **12 Claims**



5. In a parallel computer system having at least a first primary task performing means, a first secondary task performing means acting as a backup for said first primary task performing means, a second primary task performing means, a second secondary task performing means acting as a backup for said second primary task performing means, each of said task performing means having a task performing memory means, and a message bus means interconnecting said task performing means, the method of transferring messages among said task performing means, comprising the steps of:

simultaneously sending on said message bus means a plurality of messages to said second primary task peforming means and to said first and second secondary task performing means, each of said messages including a header, a body and an end of message indicator;

said second primary task performing means operating on said plurality of messages received from said first primary task performing means by initially storing said messages in a queue in its associated task performing memory means and thereafter sequentially reading said messages from said queue for processing in accordance with the task associated with said second primary task performing means;

said second secondary task performing means only storing said plurality of messages received from said first primary task performing means in a corresponding queue of its associated task performing memory means unless instructed to process at least some of said messages as a result of the failure of the operation on at least one of said messages by said second primary task performing means; and said first secondary task performing means at least counting the number of messages of the plurality of messages received from said first primary task performing means.

4,590,555

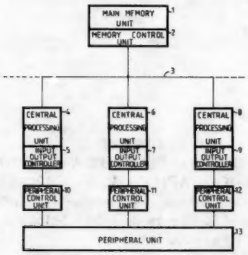
APPARATUS FOR SYNCHRONIZING AND ALLOCATING PROCESSES AMONG SEVERAL PROCESSORS OF A DATA PROCESSING SYSTEM

Jean-Marie Bourrez, Versailles, France, assignor to Compagnie Internationale pour l'Informatique Cii-Honeywell Bull (Societe Anonyme), Paris, France

Filed Dec. 11, 1980, Ser. No. 215,522
Claims priority, application France, Dec. 11, 1979, 79 30332
Int. Cl.[4] G06F *15/16, 15/46*
U.S. Cl. 364—200 **11 Claims**

1. A data processing system comprising plural individual data processors, a main memory for storing processes to be executed by the data processors, a process control block being

stored in the main memory for each process, the process control block including: for each process (a) a priority level, (b) a status indicator, (c) a start address in the main memory, and (d) the value of a process instruction count indicative of an execution point in the process where the process was previously interrupted, the main memory including for each processor (a) a status indicator and (b) address field, the main memory including plural areas for storing the processes in waiting queues, the storing areas being arranged in priority levels. the storing areas in like priority levels being linked together. each storing area having data assembled in a format to indicate (a) an address of a following process link in the waiting queue, (b) the priority of the process, (c) the number of the process corresponding to the process link, and (d) a mask for each processor, means responsive to (1) the status indicators for the processors, (2) the address field, (3) masks for the processor and (4) the



priority levels of processes in the main memory for calculating an allocation of the processes to the processors, means responsive to the calculated allocation for selectively interrupting a process being executed by a first processor, the first processor being the processor selected by the means for calculating, means responsive to the first processor being interrupted for transferring all signals for the process being executed by the first processor from the first processor to the main memory so that the main memory stores (1) interrupted process, (2) the interrupted process status indicator, and (3) the instruction count of the interrupted process in the first processor, and means for transferring signals for the interrupting process from the main memory to the first processor so that the first processor begins executing the interrupting process at the instruction of the interrupting process indicated by the value of the instruction count of the interrupting process when the interrupting process was previously interrupted.

4,590,556

CO-PROCESSOR COMBINATION

Michael F. Berger, Fort Worth, and Sammy D. Sawyer, Arlington, both of Tex., assignors to Tandy Corporation, Fort Worth, Tex.

Filed Jan. 17, 1983, Ser. No. 458,541
Int. Cl.[4] G06F 9/00
U.S. Cl. 364—200 **29 Claims**

1. A microprocessor system having means for inputting thereto an operating system comprising:

a first processor,

a second processor,

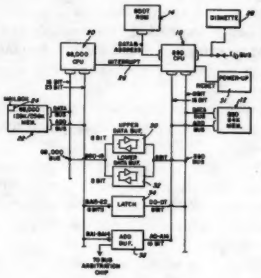
means intercoupling the first and second processors including an address bus and a data bus associated with the first processor and an address bus and a data bus associated with the second processor,

a first memory associated with the first processor and coupled thereto via the first processor address bus and data bus,

a second memory associated with the second processor and coupled thereto via the second processor address bus and data bus,

a third memory associated with the first processor and comprising a read-only memory for storing a boot strap control program,

power-up reset circuit means including means for generating a reset signal and means coupling the reset signal to the first processor causing first processor instruction operation in accordance with the boot strap control program to load the operating system into the first memory,



means responsive to said program after loading of the operating system to terminate operation in accordance with the boot strap control program and commence operation in accordance with the operating system,

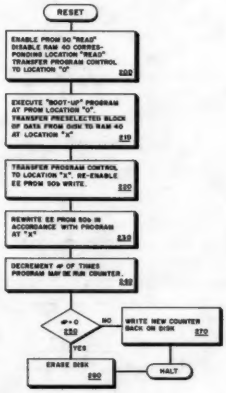
means for reading the operating system to determine if the operating system is for 8-bit operation or 16-bit operation.

4,590,557

METHOD AND APPARATUS FOR CONTROLLING SOFTWARE CONFIGURATIONS IN DATA PROCESSING SYSTEMS

Terrance L. Lillie, Palo Alto, Calif., assignor to Pitney Bowes Inc., Stamford, Conn.

Filed Sep. 12, 1983, Ser. No. 530,931
Int. Cl.[4] G06F 9/06, 12/14
U.S. Cl. 364—200 **15 Claims**


RESET
ENABLE PROM SO "READ" DISABLE RAM SO CORRESPONDING LOCATION "READ" TRANSFER PROGRAM CONTROL TO LOCATION "0"
EXECUTE "BOOT-UP" PROGRAM AT PROM LOCATION "0". TRANSFER PRESELECTED BLOCK OF DATA FROM DISK TO RAM 40 AT LOCATION "X"
TRANSFER PROGRAM CONTROL TO LOCATION "X". RE-ENABLE EE PROM SO'S WRITE.
REWRITE EE PROM SO'S IN ACCORDANCE WITH PROGRAM AT "X"
DECREMENT # OF TIMES PROGRAM MAY BE RUN COUNTER
NO
WRITE NEW COUNTER BACK ON DISK
YES
ERASE DISK
HALT

1. A data processing system comprising:

(a) a processor;

(b) a processor memory connected to said processor for storing programs to be executed by said processor;

(c) mass storage means for storing data, said data including an operating system and various optional programs for

execution by said processor, execution of said operating system controlling execution of said optional programs;

(d) means for transferring said data between said mass storage means and said processor, so that said operating system and said optional programs are loadable into said memory for execution;

(e) said transferring means including control means for controlling said transfer as specified by non-volatile information designating selected ones of said optional programs and stored in said control means so that only said designated optional programs are transferable to said memory;

(f) means for altering said non-volatile information stored in said control means in response to control signals from said processor;

(g) portable media storage means for storing data on selected portable media, such as floppy disks, used with said media storage means;

(h) initializing means containing further information for transferring data comprising a program from a portion, selected as specified by said further information, of said portable media to said processor memory for execution by said said processor;

(i) a portable medium selected for use with said media storage means from the group consisting of;

(i1) a first selectable portable medium wherein said program stored in said portion of said first medium is a program for altering said non-volatile information stored in said transfer control means and for erasing said program from said first portable medium after execution; and,

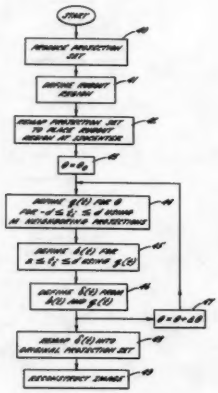
(i2) a second selectable portable medium wherein said program stored in said portion of said second medium is a boot strap program for loading said operating system into said processor memory.

4,590,558

METHOD AND APPARATUS FOR REMOVING OBJECTS FROM CT IMAGES

Gary H. Glover, Waukesha, and Norbert J. Pelc, Wauwatosa, both of Wis., assignors to General Electric Company, Waukesha, Wis.

Filed Dec. 30, 1981, Ser. No. 335,973
Int. Cl.[4] G06F *15/42*; G06K *9/40*
U.S. Cl. 364—414 **5 Claims**



2. A method of removing an object from a CT image comprising the steps of

exposing a body to radiation at a plurality of angles about the body,

detecting radiation passing through the body at the plurality of angles to create a set of projections each projection being made up of a plurality of elements,

defining in an unmodified projection set a rub-out region encompassing the object to be removed,

operating on the elements in the projection set to estimate the density of the object to be removed by combining associated elements from a plurality or nighboring projections within the rub-out region,

modifying the densities within the rub-out region by eliminating the estimated density therefrom, and

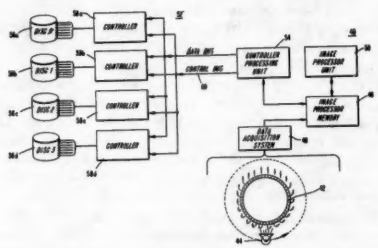
utilizing the modified densities to produce and display a corrected CT image.

4,590,559

DATA DISC SYSTEM FOR A COMPUTED TOMOGRAPHY X-RAY SCANNER

David R. Baldwin, Staines, and Douglas H. Hodgkiss, Hayes, both of England, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Nov. 23, 1983, Ser. No. 554,727
Int. Cl.[4] G06F *15/42*; G01T *1/29*
U.S. Cl. 364—414 **14 Claims**



1. A data disc system for a computed tomography X-ray scanner having a plurality of detectors, a source of X-rays movable relative to said detectors, and a memory unit which receives data from said detectors in source fan format, namely a format in which data from multiple detectors is referenced to a single source position, said system comprising:

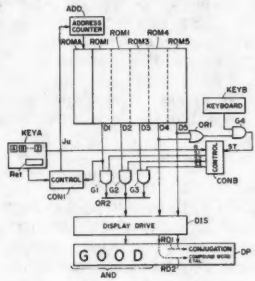
(a) a plurality of disc drives each having a plurality of ordered cylinders; and

(b) processor means for writing said data from said memory unit into said disc drives and for reading data from said disc drives back into said memory unit, said processor means ordering the storage locations of said data in said disc drives into which said data is written with at least a portion of said source fan format data for each source location stored in a different one of said disc drives, and ordering the storage locations of said data in said disc drives from which said data is read to convert said data from source fan format to detector fan format, namely a format in which data from multiple source positions is referenced to a single detector, upon said reading of said data from said disc drives into said memory unit, with at least a portion of said detector fan format data for each detector being read from a different one of said disc drives.

4,590,560
ELECTRONIC APPARATUS HAVING DICTIONARY FUNCTION

Ichiro Sado, Tokyo, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 514,358, Jul. 15, 1983, abandoned, which is a continuation of Ser. No. 184,754, Sep. 8, 1980, abandoned. This application Mar. 27, 1984, Ser. No. 593,191
Claims priority, application Japan, Sep. 14, 1979, 54-118245
Int. Cl.[4] G06F *15/20, 15/40*
U.S. Cl. 364—419 **7 Claims**



1. An electronic apparatus, comprising:

a first memory area for storing a plurality of words which each have conjugations, and a plurality of words which each have no conjugations therein;

a second memory area for storing first conjugations of the plurality of words having conjugations stored in said first memory area;

a third memory area for storing second conjugations of the plurality of words having conjugations stored in said first memory area;

a fourth memory area for storing data indicating that a particular part of said first memory area, said second memory area or said third memory area stores conjugations of words;

retrieval means for retrieving at least one of said words stored in said first memory area;

instruction means for selectively instructing retrieval of at least one word in said second memory area corresponding to said at least one word of said first memory retrieved by said retrieval means, or retrieval of at least one word in said third memory area corresponding to said at least one word of said first memory area retrieved by said retrieval means; and

display means for displaying said word retrieved by said retrieval means from said first memory area or said word retrieved from said second or said third memory area at the instruction of said instruction means, and said data stored in said fourth memory area.

4,590,561
METHOD AND APPARATUS FOR CONTROLLING REDUCTION RATIO OF CONTINUOUSLY VARIABLE TRANSMISSION WITH ACCELERATOR PEDAL DISPLACEMENT SPEED COMPENSATION

Keiju Abo, Yokosuka; Haruyoshi Kumura, Yokohama; Hiroyuki Hirano, Yokosuka; Yoshikazu Tanaka, Yokohama; Sigeaki Yamamuro, Zushi, and Yoshiro Morimoto, Yokosuka, all of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan

Filed Apr. 19, 1983, Ser. No. 486,550
Claims priority, application Japan, Apr. 19, 1982, 57-63868; Apr. 30, 1982, 57-71511; May 20, 1982, 57-83927
Int. Cl.[4] B60K *41/08;* **F16H** *9/18, 11/06;* **G05D** *17/02*
U.S. Cl. 364—424.1 **49 Claims**

1. A method from controlling a reduction ratio of a continuously variable transmission of an automotive vehicle having a brake pedal and an internal combustion engine with an accelerator pedal, comprising the steps of:

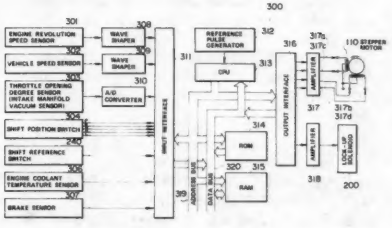
generating an engine load change speed indicative signal representing the speed of a change in load applied to the internal combustion engine;

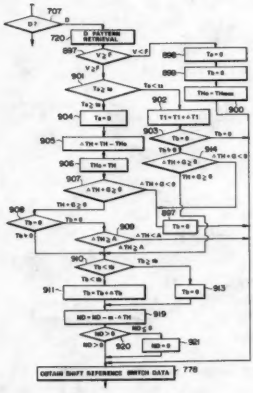
comparing said engine load change speed indicative signal with a predetemined reference and generating a comparison result indicative signal when said engine load change indicative signal satisfies a predetermined relationship with said predetermined reference;

detecting at least one operating condition of the automotive vehicle;

executing a first routine where a first desired optimum reduction ratio is determined for the detected operating condition of the automotive vehicle

and an actual reduction ratio of the continuously variable transmission is adjusted toward said first desired optimum reduction ratio;





repeating said first routine executing step; and

interrupting said first routine executing step after a predetermined condition has been satisfied and executing a second routine where a second desired optimum reduction ratio is determined for the detected operating condition of the automotive vehicle and the actual reduction ratio of the continuously variable transmission is adjusted toward said second desired reduction ratio, said predetermined condition involving generation of said comparison result indicative signal.

31. An apparatus for controlling a reduction ratio of a continuously variable transmission of an automotive vehicle having a brake pedal and an internal combustion engine with an accelerator pedal, comprising:

means for detecting an engine load of the internal combus-

tion engine and generating an engine load indicative signal representing the engine load detected;

means for detecting a parameter indicative of operating condition of the automotive vehicle and generating a parameter indicative signal; a control unit receiving inputs including said engine load indicative signal and said parameter indicative signal and generating an output signal, said control unit including a read only memory storing programs performing the steps of computing a change in the engine load indicative signal, comparing said change with a reference and generating a comparison result signal when said change attains a predetermined relationship with said reference; executing a first routine where a first desired optimum reduction ratio is determined for said engine load indicative signal and said parameter indicative signal; repeating said first routine executing step; and interrupting said first routine executing after a predetermined condition has been satisfied involving that said comparison result signal is generated and executing a second routine where a second desired optimum reduction ratio is determined for said engine load indicative signal and said parameter indicative signal; and

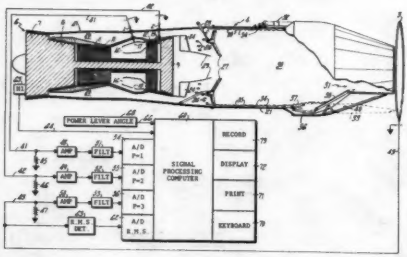
means for adjusting the actual reduction ratio of the continuously variable transmission toward a value which agrees with one of said first and second desired optimum reduction ratio in response to said output signal of said control unit.

4,590,562

STATISTICALLY CORRELATED ELECTROSTATIC ENGINE DIAGNOSTICS

Philip E. Zwicke, South Glastonbury; David M. Rosenbush, Granby, both of Conn., and Robert P. Couch, Palm Beach Gardens, Fla., assignors to United Technologies Corporation, Hartford, Conn.

Filed Dec. 28, 1982, Ser. No. 453,961
Int. Cl.[4] G01M *15/00*
U.S. Cl. 364—431.02 **3 Claims**



1. Electrostatic diagnostic apparatus for distinctly recognizing different events occurring in an operating gas turbine engine, comprising:

electrostatic signal means, including a probe to be disposed in the gas stream of an engine, for providing, when said probe is disposed in the gas stream of an operating engine, a probe signal having a waveshape defined by amplitude variations thereof across a time interval of a given duration in response to electrostatic charge flowing in the gas stream in the vicinity of said probe;

an analog to digital converter connected for response to said electrostatic signal means; and

signal processing means connected to said analog to digital converter

(a) for causing said analog to digital converter to sample the probe signal provided by said electrostatic signal means in a manner to provide a record of digital signals indicative of the amplitude variations thereof defining the waveshape thereof,

(b) for storing, in response to the amplitude of one of said digital signals being in excess of a threshold magnitude, a record comprising a contiguous sequence of said digital signals sufficient to define the waveshape of said probe signal, repetitively, to provide a classification group consisting of a given number of said records,

(c) for selectively providing, for each of said records, a particular engine event identifying signal selected, in response to said amplitude variations across said time interval, from among a plurality thereof, each said identifying signal corresponding to a related one of a plurality of engine events, in dependence on the waveshape of said probe signal having characeristics correlated to an engine event corresponding to said selected engine event identifying signal, and

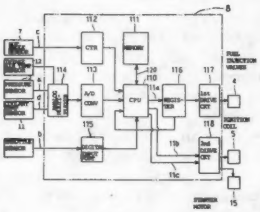
(d) for providing a particular engine event category signal, for said group, correlated to an engine event corresponding to the one of said engine event identifying signals provided for the greatest number of records in said group.

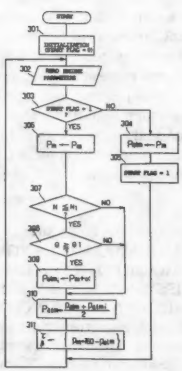
4,590,563

METHOD AND APPARATUS FOR CONTROLLING INTERNAL COMBUSTION ENGINE

Toshimi Matsumura, Aichi; Norio Omori, Kariya, and Hisanori Kobayashi, Aichi, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Sep. 29, 1982, Ser. No. 427,536
Claims priority, application Japan, Oct. 14, 1981, 56-164841
Int. Cl.[4] F02D *35/00, 41/26;* **F02P** *5/15*
U.S. Cl. 364—431.05 **24 Claims**





1. A method for controlling an internal combustion engine of the type including starter means for starting the engine, comprising the steps of:

(1) inhibiting the starter means from starting said engine;

(2) detecting an initial atmospheric pressure by measuring a signal produced by a single pressure sensor before said

engine is started, said single pressure sensor responsive to the intake pressure of said engine;

(3) generating a start enabling signal after the detection of said initial atmospheric pressure;

(4) enabling the starter means to start said engine in response to said start enabling signal;

(5) detecting a predetermined operational condition associated with said engine after said engine has been started;

(6) detecting the intake pressure of said engine when said engine is operating in said predetermined condition by measuring the signal produced by said single pressure sensor;

(7) producing an updated atmospheric pressure value from at least said detected initial atmospheric pressure and said detected intake pressure; and

(8) controlling said engine in accordance with said updated atmospheric pressure value.

8. Apparatus for controlling an internal combustion engine of the type including an ignition switch, a starter motor for starting the engine in response to operation of the ignition switch, at least one cylinder, means for controllably injecting fuel into said cylinder, means for intaking air into said cylinder and means for igniting fuel injected into said cylinder, said igniting means including an ignition coil, said apparatus comprising:

single intake pressure sensor means for producing a value indicating the intake pressure of said engine;

means for detecting a predetermined operational condition associated with said engine; and

electronic control means, operatively connected to said pressure sensor means and said condition detecting means, for:

inhibiting the engine from starting,

storing an initial atmospheric pressure value produced by said single intake pressure sensor means before said engine is started,

generating an engine starting signal after said initial atmospheric pressure value is stored,

enabling the starter motor to start the engine in response to said engine starting signal,

detecting the intake pressure of said engine when said engine is operating in said predetermined operational condition,

producing an updated atmospheric pressure value from at least said initial atmospheric pressure and said intake pressure, and

controlling said engine in accordance with said updated atmospheric pressure value.

4,590,564

METHOD OF CONTROLLING THE FUEL SUPPLY TO AN INTERNAL COMBUSTION ENGINE AT ACCELERATION

Yoshikazu Ishikawa, Saitama, and Takeo Kiuchi, Asaka, both of Japan, assignors to Honda Giken Kogyo K.K., Tokyo, Japan

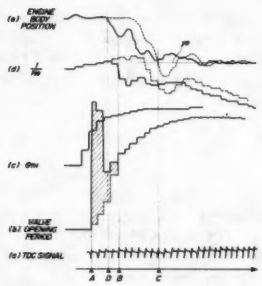
Filed Jun. 13, 1984, Ser. No. 620,110

Claims priority, application Japan, Jun. 22, 1983, 58-112297

Int. Cl.⁴ F02D *5/02*

U.S. Cl. 364—431.07 **4 Claims**

1. A method of controlling the supply of fuel to an internal combustion engine having an intake passage and a throttle valve arranged in said intake passage, wherein the value of at least one operating parameter of said engine is detected in synchronism with generation of pulses of a control signal generated at predetermined crank angle positions of said engine, and fuel is supplied to said engine in a quantity responsive to the detected value of said at least one operating parameter, the method comprising the steps of: (1) determining whether or not said engine is operating in a predetermined condition accelerating from a predetermined low load condition thereof; and (2) when it is determined in said step (1) that said engine is operating in said predetermined accelerating condition, correcting the fuel supply quantity responsive to the detected value of said at least one operating parameter by the use of an accelerating fuel increment and supplying the corrected fuel quantity to said engine, substantially for a period of time from the time said determination that said engine is operating in said predetermined accelerating condition is obtained for the first time to the time the actual quantity of intake air supplied to said



engine assumes a value required for said engine to produce output torque effective for acceleration thereof; wherein said accelerating fuel increment is set so as to decrease each time a pulse of said control signal is generated.

4,590,565

IGNITION TIMING CONTROL FOR COMPENSATING KNOCK IN BOTH STEADY-STATE AND TRANSIENT STATE

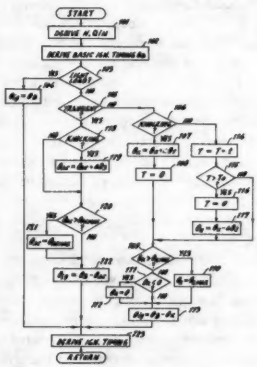
Yasuhito Takasu, Toyohashi; Toshiharu Iwata, Aichi; Hiroshi Haraguchi, and Katsuharu Hosoe, both of Kariya, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan

Filed Jun. 3, 1983, Ser. No. 500,868

Claims priority, application Japan, Jun. 9, 1982, 57-99484

Int. Cl.⁴ F02P *5/04*

U.S. Cl. 364—431.08 **19 Claims**



1. A method for controlling ignition timing of an internal combustion engine, comprising the steps of:

(a) detecting whether the engine is operating in a steady state or in a transient state;

(b) deriving a steady-state ignition timing variable when the engine is operating in steady state and deriving a transient-state ignition timing variable when the engine is operating in transient state;

(c) detecting the presence of an engine knock;

(d) trimming said steady-state ignition timing variable with a first trimming value in response to there being a simultaneous presence of said steady state and said engine knock

or trimming said transient-state ignition timing variable with a second trimming value in response to there being a simultaneous presence of said transient state and said engine knock;

(e) storing said first and second trimming values in a memory; and

(f) causing ignition to occur in accordance with the trimmed steady-state ignition timing variable in the presence of said steady state or in accordance with said trimmed transient-state ignition timing variable in the presence of said transient state.

4,590,566

SYSTEM FOR DIAGNOSING AN INTERNAL COMBUSTION ENGINE

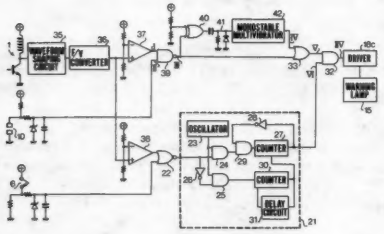
Toshio Takahashi, Mitakashi, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan

Filed Sep. 26, 1983, Ser. No. 536,014

Claims priority, application Japan, Oct. 1, 1983, 57-173629

Int. Cl.[4] F02D *35/00*

U.S. Cl. 364—431.11 **3 Claims**



1. In a system for diagnosing an internal combustion engine having a starter and a starter switch effective to produce a starter signal dependent on the operation of the starter switch, and first means for generating an engine speed signal dependent on engine speed, the improvement comprising

a first comparator responsive to the engine speed signal for detecting the engine speed during cranking of the engine and producing a cranking signal;

starter operation diagnosing circuit means responsive to the starter signal of said starter switch for producing a failure output when an absence of the starter signal during a presence of the cranking signal continues for a predetermined period;

a second comparator for producing an engine operating signal when the engine speed signal exceeds idling speed;

a terminal for grounding a circuit and for producing a grounding signal during the grounding;

first gate means responsive to said engine operating signal of said second comparator and to the grounding signal for producing a first signal having a first logic level during the presence of the grounding signal and a second signal having a different, second logic level during the absence of the grounding signal and during the presence of the engine operating signal;

second means responsive to the second signal having the second logic level for producing a third signal;

second gate means for providing a fourth signal upon occurrence of said failure output of said starter operation diagnosing circuit means and the first signal having the first logic level and respectively said second signal; and

warning means operated by said fourth signal from said second gate means.

4,590,567

LARGE ANGLE, GRAVITY COMPENSATED, BANK-TO-TURN PURSUIT CONTROLLER

Lee G. Hofmann, Vestal, and Charles J. Dittmar, Jr., Binghamton, both of N.Y., assignors to General Electric Company, Binghamton, N.Y.

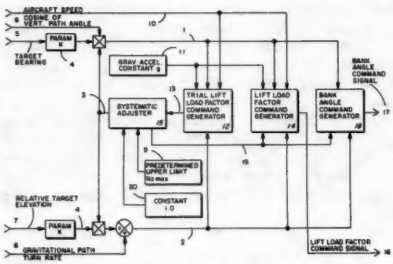
Division of Ser. No. 336,910, Jan. 4, 1982, Pat. No. 4,511,972.

This application Mar. 7, 1985, Ser. No. 709,477

The portion of the term of this patent subsequent to Apr. 16, 2002, has been disclaimed.

Int. Cl.[4] G06F *15/50*; G06G *7/78*

U.S. Cl. 364—434 **2 Claims**



1. A system for accomplishing bank-to-turn pursuits steering of an aircraft; comprising:

means for generating a lift load factor attenuation signal;

means for generating first and second signals representing the components of commanded path turn rate in the transverse and vertical planes respectively, the latter being compensated for gravitational path turn rate, the said first and second signals varying in response to and as a function of the lift load factor attenuation signal;

means for generating a lift load factor command signal which is less than or equal to a predetermined limit, the said lift load factor command signal generating means having as inputs the first and second signals and gravitational and aircraft performance input components;

means for generating a bank angle command signal for use with the lift load factor command signal, the said bank angle command signal generating means having inputs of the said first and second signals, and adjusted as a function of the lift load attenuation command signal; and

means for coupling said bank angle command signal and said lift load factor command signal to the aircraft bank and lift adjusting control surface elements to modify the aircraft bank angle and lift.

4,590,568

METHOD OF AND DEVICE FOR OPERATING A MOTOR VEHICLE AT A RATE OF FUEL CONSUMPTION RELATED TO DISTANCE

Heiko Barske, Ingolstadt, and Bernd Posch, Munich, both of Fed. Rep. of Germany, assignors to Audi AG, Ingolstadt, Fed. Rep. of Germany

Filed Oct. 5, 1983, Ser. No. 539,188

Claims priority, application Fed. Rep. of Germany, Oct. 6, 1982, 3236990

Int. Cl.[4] G01M *15/00*

U.S. Cl. 364—442 **19 Claims**

4. A device for operating an automotive vehicle with a given quantity of fuel for a predetermined distance, comprising:

means for generating a first signal representative of the predetermined distance;

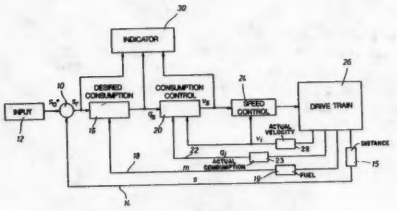
means for measuring the given quantity of fuel and for generating a second signal representative thereof;

means for calculating from said first and second signals a value representative of a permissible rate of fuel consumption for operating the vehicle for said predetermined

distance and for generating a third signal representative of said value;

means for measuring the actual rateof fuel consumption and for generating a fourth signal representative thereof;

means for comparing said third and fourth signals and for deriving a fifth signal representative of the difference



between the permissible and actual rates of consumption; and

means responsive to said fifth signal and cooperating with an output control member of the drive train of said automotive vehicle for adjusting the output thereof such that the actual rate of consumption substantially equals the permissible rate.

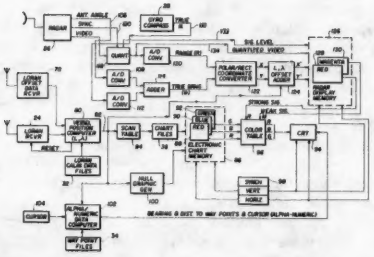
4,590,569

NAVIGATION SYSTEM INCLUDING AN INTEGRATED ELECTRONIC CHART DISPLAY

Mortimer Rogoff, Washington, D.C.; Peter M. Winkler, Atlanta, Ga., and John N. Ackley, Saline, Mich., assignors to Navigation Sciences Inc., Bethesda, Md.

Filed Oct. 14, 1983, Ser. No. 542,165
Int. Cl.[4] G06F *15/50*; G01S *7/06*
U.S. Cl. 364—452 **41 Claims**

MICROFICHE APPENDIX INCLUDED
(76 Microfiche, 1 Pages)



22. A method of navigating a vehicle, comprising the steps of:

(a) fixing the present geographical location of said vehicle within a predetermined localized area and generating electrical signals corresponding to said present location;

(b) generating an electronic navigational chart in response to said electrical signals and including land contours, land masses and other fixed objects in said localized area;

(c) detecting objects in said localized area on board said vehicle and generating electrical signals for an electronic map of the detected land contours, land masses, other fixed objects as well as moving objects in said localized area;

(d) establishing the geographic center of said map independently of detecting objects in accordance with step (c) and generating offset signals corresponding to the vehicle's real time position in longitude and latitude relative to said navigational chart as well as being oriented along a common compass reference;

(e) electronically combining said signals of a navigational chart and said signals of a map in response to said offset signals and generating composite signals therefrom wherein an accurate alignment of said map and said chart is inherently effected automatically when displayed; and

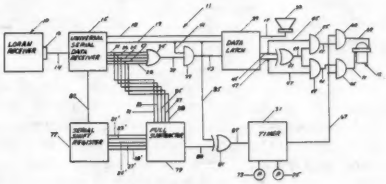
(f) generating a composite map type visual display indicating said land contours, land masses, said fixed and moving objects for aiding said vehicle navigating through said localized area.

4,590,570

MARINE NAVIGATIONAL AID

Carl J. Rader, 357 NW. 87th Ter., Coral Springs, Fla. 33065

Filed Jan. 14, 1983, Ser. No. 458,152
Int. Cl.[4] G01S *1/20*; G05B *11/01*
U.S. Cl. 364—452 **9 Claims**



1. Improved apparatus for steering a vessel along a predetermined course, said apparatus interfacing with a Loran receiver which outputs data in a serial mode and with an auto pilot comprising

means for converting the output of said receiver into parallel signals

means for storing said parallel signals and for releasing said stored parallel signals at predetermined time intervals

means for converting said parallel signals into course correction signals

means for inputtting said course correction signals to said auto pilot, and

means for allowing said auto pilot to receive said course-correcting signals for a first predetermined period of time and then preventing said auto pilot from receiving said course correction signals for a second predetermined period of time whereby the vessel is steered in a course-correcting mode for said first predetermined period of time and the vessel is steered in a straight-ahead mode for said second predetermined period of time.

4,590,571

ELECTRONIC MEASURING AND RECORDING APPARATUS FOR USE IN WHEELED VEHICLES

Ib Larsen, Fasanvaenget 5, Slagelse, Denmark (DK-4200)

Continuation of Ser. No. 314,053, filed as PCT DK81/00021, Feb. 20, 1981, published as WO81/02483, Sep. 3, 1981, § 102(e) date Oct. 19, 1981, abandoned.
This application Jun. 12, 1984, Ser. No. 619,398
Int. Cl.[4] G07B *13/04*
U.S. Cl. 364—467 **10 Claims**

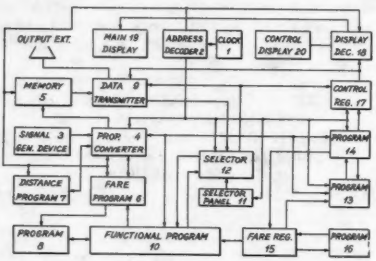
1. An electronic taximeter for use in a vehicle and comprising:

a clock for generating time pulses,

a signal generating device for generating distance pulses corresponding to a distance traveled by the vehicle,

a proportional converter means which is connected to said clock and to said signal generating device for generating debit pulses from said time pulses and from said distance pulses supplied from said clock and from said signal generating device, respectively, and a fare program means which is connected to said proportional converter means for controlling the generation of said debit pulses such

that in a first operational mode, said debit pulses are generated by adding, within a predetermined period of time corresponding to a predetermined number of time pulses, said predetermined number of time pulses and any number of distance pulses generated by said signal generating device within said predetermined period of time in excess



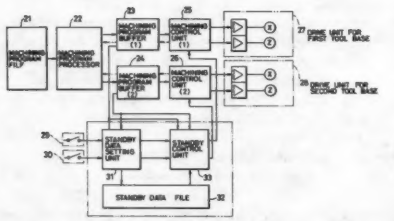
of said predetermined number of time pulses, and such that in a second operational mode, said debit pulses are generated by adding, within said predetermined period of time corresponding to said predetermined number of time pulses, said predetermined number of time pulses and said number of distance pulses generated by said signal generating device within said predetermined period of time.

4,590,572

SYSTEM FOR MODIFYING A SYNCHRONIZED CONTROL PROGRAM FOR PLURAL TOOL BASES BY ADDING STANDBY DATA

Kazuo Imanishi, Aichi, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed May 23, 1984, Ser. No. 613,475
Claims priority, application Japan, May 23, 1983, 58-90276
Int. Cl.[4] G05B *7/00*
U.S. Cl. 364—474 **4 Claims**


MACHINING PROGRAM FILE
MACHINING PROGRAM PROCESSOR
MACHINING PROGRAM BUFFER (1)
MACHINING CONTROL UNIT (1)
MACHINING PROGRAM BUFFER (2)
MACHINING CONTROL UNIT (2)
DRIVE UNIT FOR FIRST TOOL BASE
DRIVE UNIT FOR SECOND TOOL BASE
STANDBY DATA SETTING UNIT
STANDBY CONTROL UNIT
STANDBY DATA FILE

1. A numerical control unit for a lathe having a plurality of tool bases, comprising:

(a) means for entering standby commands for temporarily stopping the tool bases while the tool bases are being simultaneously operated under respective machining programs;

(b) a standby data setting unit for storing a program number and a block number of the machining program for a one of the tool bases stopped in movement by the standby command, and for releasing said one of the tool bases as stopped when said standby command is removed and storing as standby data the program number and the block number of the machining program for another tool base at the time;

(c) a standby data file for successively storing standby data set by said standby data setting unit a plurality of times during an operation; and

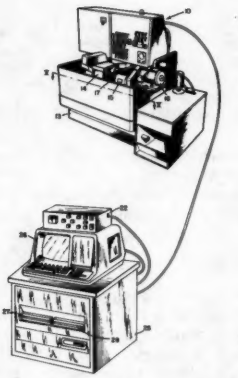
(d) a standby control unit for referring to standby data in said standby data file from a previous operation, detecting a standby block from the machining programs being executed for said tool bases, issuing a standby command to temporarily stop one of said tool bases, and detecting a standby release block from the machining program being executed for another tool base to remove the standby command.

4,590,573

COMPUTER-CONTROLLED GRINDING MACHINE

Robert Hahn, 26 Rice Ave., Northboro, Mass. 01532

Filed Sep. 17, 1982, Ser. No. 419,319
Int. Cl.[4] G05B *19/18;* **G06F** *15/46;* **B24B** *51/00*
U.S. Cl. 364—474 **14 Claims**



1. Grinding machine for finishing a surface of revolution on a workpiece, comprising:

(a) a base,

(b) a workhead mounted on the base for supporting the workpiece and rotating it about the axis of the surface of revolution,

(c) a wheelhead mounted on the base and having a rotatable spindle which is adapted to carry an abrasive wheel,

(d) feed means to produce relative movement between the wheelhead and the workhead to produce a grinding cycle between the abrasive wheel and the workpiece,

(e) a sensor for measuring the force between the wheel and the workpiece at a plurality of time intervals during a revolution of the workpiece and generating a corresponding plurality of analog electrical signals indicative of the said force, including a converter for changing the analog signals to digital signals, and

(f) a digital computer to which the sensor is connected, the computer being connected to the feed means for the regulation thereof, the computer containing a program for regulating the feed means in such a way that the operative surface of the wheel is maintained at a predetermined forced-independent position during a given creep-feed revolution of the workpiece to perform a rounding up operation, wherein the program contains a routine that causes the computer to actuate the feed means to advance the abrasive wheel toward said surface of the workpiece while the workhead is rotating at high speed until the signal from the sensor indicates that contact is continuous, the program contains a routine that then causes the computer to determine if the said surface of the workpiece is out-of-round and, if it is out-of-round, enters a routine that changes the workhead rotation to a low speed for creep grinding and to progress into a ROUND-UP routine, including a sub-routine causing the feed means to move the wheelhead toward or away from the said surface in accordance with the formula

$$DX(J) = \frac{-AF}{100} \frac{(Kc + Ks)}{Ks} DZ(J)$$

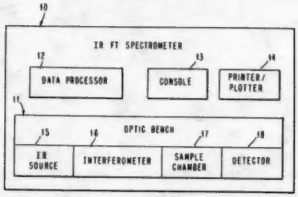
where DX(J) is the incremental amount of slide movement, AF is an attenuation factor, Kc is the cutting stiffness, Ks is the system rigidity, and DZ(J) is the calculated change in deflection caused by the measured change in force.

4,590,574

METHOD FOR DETERMINING OXYGEN AND CARBON IN SILICON SEMICONDUCTOR WAFER HAVING ROUGH SURFACE

Harold D. Edmonds, Hopewell Junction, and Murlidhar V. Kulkarni, Fishkill, both of N.Y., assignors to International Business Machines Corp., Armonk, N.Y.

Filed Apr. 29, 1983, Ser. No. 489,930
Int. Cl.[4] G06F *15/20*; G06G *7/58*
U.S. Cl. 364—498 **10 Claims**



1. The method for determining the element content of oxygen and carbon in a sample semiconductor wafer having at least one rough surface, by means of an IRFT spectrometer including a data processing system, comprising the steps, carried out by said spectrometer, of:

(a) measuring an absorbance spectrum of the sample wafer and storing digitized values of said spectrum in said data process system, said spectrum comprising absorbance values at different wavelengths of infrared energy;

(b) deriving, in said data processing system, from said digitized values of said spectrum a roughness factor proportional to the degree of roughness of said rough surface;

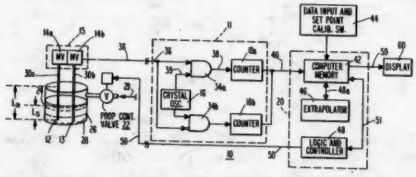
(c) and determining in said data process system the content of oxygen and carbon in said sample wafer by means of said roughness factor.

4,590,575

DIELECTRIC COMPENSATED LEVEL CONTROL SYSTEM FOR USE IN TANKS CONTAINING SUBSTANCE

Raymond H. Emplit, Glen Mills, Pa., assignor to Robertshaw Controls Company, Richmond, Va.

Continuation-in-part of Ser. No. 330,865, Dec. 15, 1981, abandoned. This application Sep. 30, 1983, Ser. No. 537,641
Int. Cl.[4] G01F *23/26*
U.S. Cl. 364—509 **10 Claims**



1. An on-line dielectric compensated level indicator system for determining the substance level within a container independently of changes in the dielectric constant of differing substances without probe span recalibration having a first and second capacitance probe positioned within the container, each with a respective zero capacitance when no substrate is in the container comprising:

means for producing (1) a first time interval signal representative of the capacitance between the first probe and the container containing a substance and (2) a second time interval signal representative of the capacitance between the second probe and the container containing a substance thereby producing a probe span related to time and thus unlimited with respect to the magnitude of substance dielectric constant;

control means including means for receiving the time interval signals and subtracting (1) a signal representative of the zero capacitance of the first probe from the first time interval signal for producing a first different signal and (2) a signal representative of the zero capacitance of the second probe from the second time interval signal for producing a second difference signal;

ratio means for receiving the first and second difference signals from the subtracting means and determining the ratio of the first difference signal to the second difference signal for producing a signal representative of the substance level independently of the dielectric constant of the substance; and

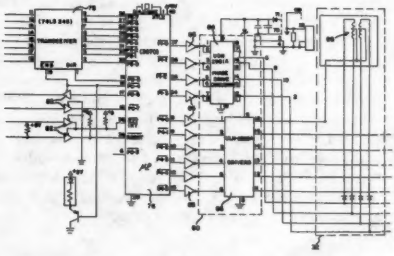
scaling means responsive to the ratio means for producing from the ratio of the first and second difference signals a signal representative of the level of substance within the container.

4,590,576

CONTROL SYSTEM FOR FLOW CONTROL VALVES

Boris Elpiner, Northbrook, Ill., assignor to Mark Controls Corporation, Evanston, Ill.

Filed Jul. 26, 1984, Ser. No. 634,646
Int. Cl.[4] G06F *15/00*
U.S. Cl. 364—510 **25 Claims**



1. A system for controlling variables of a pneumatic system by a plurality of motor driven valve means responsive to sensing of selected control system parameters, the system minimizing disruption of said variables while operating within maximum power consumption limits, comprising:

program means for providing a predetermined set of operating values for said pneumatic parameters;

means for sensing said selected parameters and providing a sensing signal output; and

processor means for monitoring each of said plurality of valve means and for operating in a first direction a first one of said plurality of valve means for at least a portion of a predetermined duty cycle responsive to a comparison signal provided by comparing said sensing signal output with said predetermined set of operating values, and said processor means further selecting for operation in said first direction for at least a portion of the remainder of said predetermined duty cycle an additional predetermined maximum number of the valve means less than the plural-

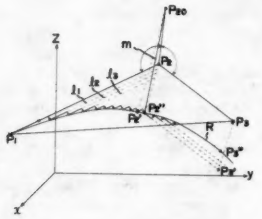
ity thereof, wherein operation of said first one and of said additional valve means continues to the end of said duty cycle unless said predetermined set of operating values is first attained.

4,590,577

WELDING ROBOT CONTROLLING METHOD

Satoru Nio, Kitakyushu; Toyoji Hamashima, Nakama, and Shinobu Sato, Kitakyushu, all of Japan, assignors to Yaskawa Electric Mfg. Co., Ltd., Kitakyushu, Japan

Filed Dec. 1, 1982, Ser. No. 432,785
Int. Cl.⁴ B23R *9/02, 9/12*
U.S. Cl. 364—513 **48 Claims**



1. A welding robot controlling method for controlling a welding robot having a welding torch guided toward a teaching direction and a sensor which intermittently generates a locus correction signal for the tip of said welding torch, comprising

(1) giving said locus correction signal as a resultant vector of an arbitrary number of two-dimensional vectors on a plane which intersects a welding line direction,

(2) correcting a locus of said tip of said welding torch by controlling three basic axes of said robot in a direction of a resultant vector composed of a correction vector representing said locus correction signal and a vector (hereinafter called r vector) which, through a position of said tip of said welding torch, has a direction vector parallel to a line connecting two teaching points, and has a predetermined length, when said locus correction signal is generated, and

(3) controlling said three basic axes of said robot such that said tip of said welding torch moves on a line which is parallel to said line connecting said two teaching points and passes through a position of said tip of said welding torch immediately after completion of said locus correction, until a subsequent locus correction signal is given after completion of said locus correction.

4,590,578

OFF-LINE PROGRAMMABLE ROBOT

John J. Barto, Jr., Cheshire; Peter M. Walsh, So. Windsor; Peter R. Fitzpatrick, Glastonbury; Richard F. Dondero, So. Meriden; Kenneth P. Demers, W. Hartford, and Stephen M. Gardner, Enfield, all of Conn., assignors to United Technologies Corporation, Hartford, Conn.

Filed Jul. 11, 1983, Ser. No. 512,829
Int. Cl.⁴ G06F *15/46*
U.S. Cl. 364—513 **3 Claims**

1. A method for accurately performing a machine operation at a plurality of locations on a workpiece with a robot that is under the direction of a controller, that comprises:

mounting the workpiece in a predetermined manner to a fixture;

providing a plurality of alignment points on the fixture;

positioning the robot to measure the position of the alignment points and providing coordinate data to the controller indicative of the measured position of the alignment points;

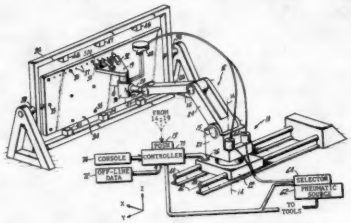
determining a first coordinate transformation based on the measured alignment point coordinates and storing said first coordinate transformation in the controller;

providing at least two local features on the workpiece;

providing nominal local feature coordinates to the controller indicative of the expected location in robot coordinates of the at least two local features on the workpiece;

applying the first coordinate transformation to the nominal local feature coordinates to provide corrected local feature coordinates and storing the corrected local feature coordinates in the controller;

positioning the robot in response to the corrected local feature coordinates to measure the actual position of the at least two local features on the workpiece and providing coordinate data to the controller indicative of the measured position of the at least two local features;



determining a second coordinate transformation based on a comparison of the nominal local feature coordinates and the measured local feature position and storing the second coordinate transformation in the controller;

providing nominal machine operation location coordinates to the controller indicative of the plurality of locations on the workpiece;

applying the second coordinate transformation to the nominal machine operation location coordinates to provide corrected machine operation location coordinates and storing the corrected machine operation location coordinates in the controller.

positioning the robot in response to the corrected machine operation location coordinates to perform the machine operation at the plurality of locations on the workpiece; and

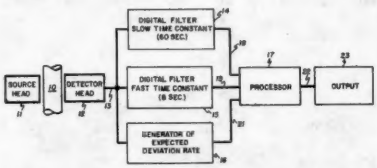
performing the machine operation at the plurality of locations on the workpiece.

4,590,579

APPARATUS AND METHOD FOR DIGITAL SPECIFIC GRAVITY MEASUREMENT

Tom L. Erb, Austin, Tex., assignor to Ramsey Engineering Company, St. Paul, Minn.

Filed Oct. 4, 1983, Ser. No. 539,045
Int. Cl.⁴ G01N *7/00, 9/00*
U.S. Cl. 364—558 **12 Claims**



1. A dynamic tracking device for controlling a process by minimizing statistical deviation in the output of a radiation detector for controlling a process, said tracking device comprising: means for filtering to generate a fast time constant signal from the output of said detector; means for filtering to generate a slow time constant signal from the output of said detector; means for determining divergence of said fast and

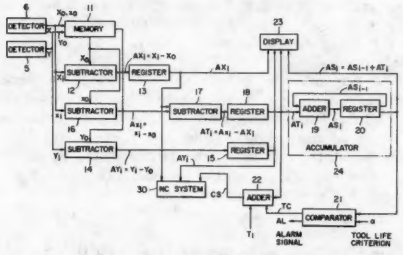
slow signals; and processor means responsive to said divergence to switch between the values of the two said signals to produce a smooth and coherent device output.

4,590,580

AUTOMATIC MEASUREMENT/COMPENSATION APPARATUS FOR TOOL DIAMETER

Isao Takezawa, and Shunsuke Wakaoka, both of Nagoya, Japan, assignors to Kabushiki Kaisha Okuma Tekkosho, Aichi, Japan

Filed Aug. 9, 1983, Ser. No. 522,252
Claims priority, application Japan, Oct. 12, 1982, 57-178845
Int. Cl.[4] G06F *15/46;* G05B *19/18*
U.S. Cl. 364—571 **5 Claims**



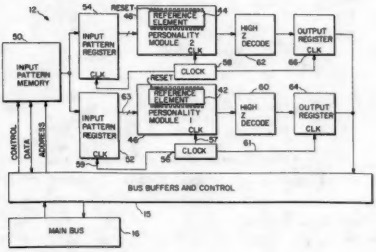
1. An automatic measurement/compensation apparatus for the tool diameter of a machine tool which machines a workpiece by rotating a tool mounted on a main spindle, comprising a first non-contact detector provided on a fitting table of the machine tool which detects the displacement in one direction from the center of rotation of the rotating tool, a memory which stores the initial value X_0 measured by said detector of a reference tool when it is mounted on the main spindle and rotated and the initial value x_0 measured by said detector of an object tool before working when it is mounted and rotated, a first subtractor which calculates the thermal displacement amount AX_i of the difference between the measured value X_i of the object tool after the predetermined number of workpieces by said detector and the initial value X_0 stored in said memory, a first register which stores the subtraction value AX_i from said first subtractor, a second subtractor which calculates the variation in tool diameter of the difference between the measured value x_i of the object tool after the predetermined number of workpieces detected by said detector and the initial value x_0 stored in said memory, a third subtractor which calculates the tool compensation value AT_i of the difference between the tool variation Ax_i from said second subtractor and the thermal displacement amount AX_i stored in said first register, a second register which stores the tool compensation amount AT_i from said third subtractor, an accumulator which accumulates the values sequentially stored in said second register, a comparator which compares the accumulated value AS_i of said accumulator with a tool life criterion α and outputs an alarm signal if the relation $AS_i \cong \alpha$ holds, and outputs a tool compensation signal, if the relation $AS_i < \alpha$ holds, and a first adder which adds the tool compensation value AT_i of said second register to the initial tool compensation value T_1 for generating a tool compensation signal CS, and for applying said CS signal to an NC system.

4,590,581

METHOD AND APPARATUS FOR MODELING SYSTEMS OF COMPLEX CIRCUITS

L. Curtis Widdoes, Jr., Sunnyvale, Calif., assignor to Valid Logic Systems, Inc., San Jose, Calif.

Filed May 9, 1983, Ser. No. 492,985
Int. Cl.[4] G06G *7/48, 11/00*
U.S. Cl. 364—578 **20 Claims**



16. For use in a simulation system an apparatus for modeling operation of at least one complex digital device within said simulation system, said apparatus comprising:

means for storing at least a single digital input pattern in a sequence of digital input patterns for use as input signals to a reference element, said reference element being a physical specimen of said complex digital device;

means for electrically coupling said reference element to receive said input signals;

means electrically coupled to said reference element coupling means for controlling clocking of said reference element independent of operation of said simulation system;

means electrically coupled to said reference element coupling means for presenting to said reference element said sequence of said digital input patterns, said presenting means to reset said reference element, to repeatedly present said sequence of said digital input patterns to said reference element and to increment the number of clock cycles of said sequence of digital input patterns with each addition of a digital input pattern;

means electrically coupled to said reference element coupling means for sampling output signals of said reference element after said presenting of a last one of said digital input patterns in said sequence of digital input patterns, said output signals for use by said simulation system; and

means electrically coupled to said presenting means and responsive to said simulation system for receiving and directing to said storing means a next one of said digital input pattern in said sequence of digital input patterns.

4,590,582

IMAGE DATA PROCESSING APPARATUS FOR PERFORMING SPATIAL FILTERING OF IMAGE DATA

Yoshiyuki Umemura, Tochigi, Japan, assignor to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Oct. 6, 1983, Ser. No. 539,401
Claims priority, application Japan, Oct. 7, 1982, 57-176700; Dec. 28, 1982, 57-233565
Int. Cl.[4] G06F *3/153, 15/31;* H04N *5/32*
U.S. Cl. 364—724 **11 Claims**

1. A filtering apparatus for digital image data comprising:

first memory means for storing original image data;

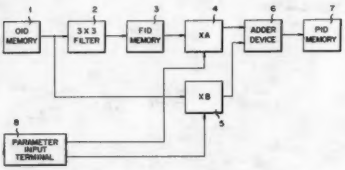
filtering means for smoothening said original image data derived from said first memory means to produce smoothened image data;

second storage means for storing said smoothened image data derived from said filtering means;

first multiplier means for multiplying said smoothened image

data, derived from said second storage means, by a first constant;

second multiplier means for multiplying said original image data, derived from said first memory means, by a second constant;



adder means for adding said smoothened image data multiplied by said first constant to said original image data multiplied by said second constant to produce filtered image data; and

control means for adjusting said first constant and second constant to vary characteristics of said filtered image data.

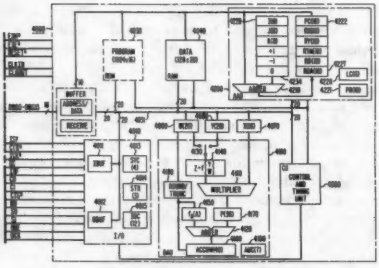
4,590,583

COIN TELEPHONE MEASUREMENT CIRCUITRY

Hubert A. Miller, Manassas, Va., assignor to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jul. 16, 1982, Ser. No. 399,178
Int. Cl.⁴ G06F *7/38*
U.S. Cl. 364—724 **3 Claims**

MICROFICHE APPENDIX INCLUDED
(18 Microfiche, 1055 Pages)



1. A method for detecting a tone in a signal formed by superimposing bursts of said tone on a DC level comprising the steps of

loading a low-pass digital filter with samples indicative of a nominal value of said DC level,

sampling said signal at a rate at least twice the highest frequency of said tone to generate an input sequence,

filtering said input sequence with said low-pass filter to produce an output sequence,

forming the difference between said input sequence and said output sequence to obtain a resultant sequence, and

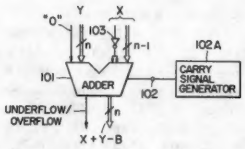
filtering said resultant sequence with a bandpass digital filter having the frequency of said tone in the passband of said bandpass filter to produce a filtered sequence having an energy average above a threshold whenever said tone is present.

4,590,584

METHOD AND SYSTEM FOR PROCESSING EXPONENTS IN FLOATING-POINT MULTIPLICATION

Toshiyuki Yaguchi, Yokohama; Akira Kanuma, Zushi, and Kiichiro Tamaru, Tokyo, all of Japan, assignors to Tokyo Shibaura Denki Kabushiki Kaisha, Kawasaki, Japan

Filed Dec. 19, 1983, Ser. No. 562,736
Claims priority, application Japan, Dec. 24, 1982, 57-228002
Int. Cl.⁴ G06F *7/52*
U.S. Cl. 364—748 **7 Claims**



1. An exponent processing method in floating-point multiplication determining a product of two operands of floating-point format, said exponent processing method being for determining a sum Z of exponents X and Y of n bits of the two operands, and comprising:

applying an inversion of the MSB, i.e., (n−1)-th bit of one of the exponents (e.g., X) to the n-th bit and the (n−1)-th bit of a first input terminal set of an adder capable of performing an addition of (n+1) bits,

applying all the bits except the MSB, i.e., the (n−2)-th to 0-th bits of the exponent (X) to the (n−2)-th to 0-th bits of said first input terminal set,

applying a signal "0" to the n-th bit of a second input terminal set of the adder,

applying all the bits, i.e., the (n−1)-th to the 0-th bits of the other exponent (Y) to the (n−1)-th to the 0-th bits of said second input terminal set,

applying a signal "1" to a carry input terminal of the adder, and

using the (n−1)-th to the 0-th bits of the output of the adder as bits constituting the sum Z.

4,590,585

CHARACTER GENERATOR FOR RASTER PRINTER

Kenneth D. Cummings; Donald R. Gould; Forrest C. Gray, all of Tucson, Ariz., and Lawrence W. Pereira, San Jose, Calif., assignors to International Business Machines, Armonk, N.Y.

Filed Aug. 13, 1982, Ser. No. 407,967
Int. Cl.⁴ G06F *3/12*
U.S. Cl. 364—900 **18 Claims**

1. A character generator for a printing system for printing text and image patterns on a print medium in raster fashion in successive scan lines in response to input data comprising:

a character generator bus structure to provide a conductive path to transmit data signals and control signals within said character generator;

pattern storage means for storing raster pattern data for each of the text and image patterns, said pattern storage means coupled to said bus structure;

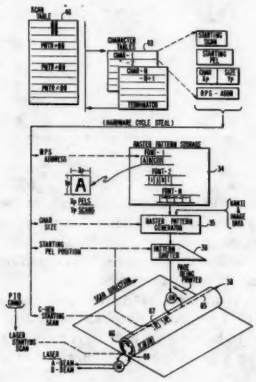
input means for assembling patterns forming a page to be printed on a print medium in a raster pattern in a plurality of successive scan lines, said input means including means for generating format data for each pattern and means for storing said format data, said format data comprising format position data for specifying the position of the pattern on the page, format size data for specifying the size of the pattern, and format location data for specifying the location of the pattern in said pattern storage means, said input means being coupled to transmit data signals and control signals to said bus structure;

means for accessing, from said input means, said format data

to identify those patterns beginning within a predetermined group of said scan lines;

output buffer means for storing output raster pattern data for presentation in sequence to an output device for controlling the printing of the pattern defined by said output raster pattern data, said output buffer means being coupled to said bus structure;

first control means operable in response to said format location data to read out said raster pattern data from said pattern storage means;



second control means operable in response to said format position data and said format size data to store said raster pattern data, that was read out from said pattern storage means, into said output buffer means in the size and position defined by said format data; and

third control means for accessing said output raster pattern data stored in said output buffer means in the sequence required for printing by an output means so that a printed pattern corresponding to each of the patterns defined by said format data can be printed on said print medium.

4,590,586

FORCED CLEAR OF A MEMORY TIME-OUT TO A MAINTENANCE EXERCISER

Daniel K. Zenk, Stillwater, and Wayne A. Michaelson, Lake Elmo, both of Minn., assignors to Sperry Corporation, N.Y.

Filed Jul. 12, 1984, Ser. No. 630,140

Int. Cl.[4] G06F *12/00, 11/00*

U.S. Cl. 364—900 **3 Claims**

1. In a single large scale memory unit

containing a multiplicity of independently simultaneously operative storage memory banks,

receiving from a maintenance exerciser type requestor one of a multiplicity of requestors' requests to inoperative, non-responding, ones of said multiplicity of simultaneously operative storage memory banks, concurrently to

receiving from other requestor ones of said multiplicity of requestors' requests to correctly operative and responding ones of said multiplicity of simultaneously operative storage memory banks,

prioritizing in a priority network the requests from all said multiplicity of requestors in order to apply a prioritized plurality of such requests to a like plurality of said multiplicity of simultaneously operative storage memory banks,

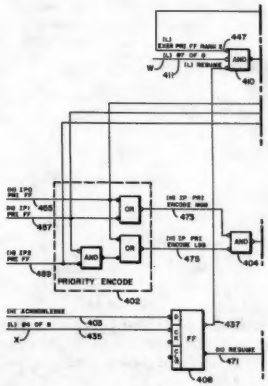
an improvement to said priority network allowing that successive prioritizations may transpire even though each single one of said like plurality of simultaneously operative storage memory banks does not positively acknowledge of the receipt of one of said prioritized plurality of requests, said improvement to the priority network apparatus of a large scale memory unit comprising:

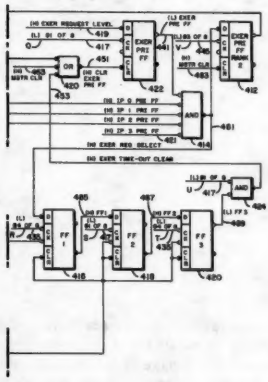
prioritization means

for prioritizing the requests of a multiplicity of requestors including the request of a maintenance exerciser type one of said multiplicity of requestors,

for applying a prioritized plurality of said requests, including within said prioritized plurality of said requests said request of said maintenance exerciser type one of said multiplicity of requestors, to a like plurality port of a multiplicity of independently simultaneously operative storage memory banks, and

for performing successive said prioritizing if, only if, and





when each of said prioritized plurality of requests is acknowledged, else if any of said prioritized plurality of requests fail to be acknowledged then suffering that each one or ones of said multiplicity of requestors as did give rise to those request or requests which did fail to be acknowledged should suffer a time-out, meaning a prolonged interval within which successive said prioritizing will not transpire amongst and between any requests of any said multiplicity of requestors, after which said time-out interval said prioritizing may upon the presence of requests resume, and

forced clear of a memory time-out to a maintenance exerciser means for providing, responsively to only that one prioritized request of said prioritized plurality of requests

which did arise from said maintenance exerciser type one of said multiplicity of requestors, and conditionally only if an acknowledgment is not normally timely forthcoming from the one of said like plurality of storage memory banks which was requested by said one prioritized request which did arise from said maintenance exerciser type one of said multiplicity of requestors, a substitutionary acknowledgment to that said one prioritized request of said prioritized plurality of requests which did arise from said maintenance exerciser type one of said multiplicity of requestors, WHEREIN said substitutionary acknowledgment makes that said maintenance exerciser type one, only, of said multiplicity of requestors will not suffer said time-out, and does additionally make that said prioritization means will, all additional ones of said prioritized plurality of requests being acknowledged, immediately proceed to said performing successive said prioritizing without waiting said time-out interval.

4,590,587

MAGNETIC BUBBLE MEMORY DEVICE

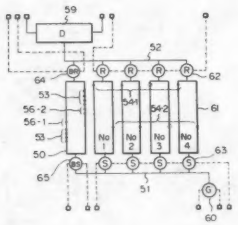
Seiichi Iwasa, Sagamihara; Kengo Nogiwa, Inagi, and Yoshiya Kaneko, Tokyo, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed May 2, 1984, Ser. No. 606,407

Claims priority, application Japan, May 31, 1983, 58-094961

Int. Cl.[4] G11C *19/08*

U.S. Cl. 365—1 **16 Claims**



1. A magnetic bubble memory device comprising:

a plurality of minor loops for data storage, in at least one predetermined page of which faulty loop data indicating any respective faulty ones of said minor loops is stored;

at least one boot loop for storing at least one header data to designate said predetermined page;

a major line for reading out the data stored on said minor and boot loops; and

control means for reading out onto said major line data stored in said boot loop independently of the reading out of said faulty loop data from said minor loops and for reading out said faulty loop data from said minor loops after said header data is read out from said boot loop;

wherein said predetermined page, at which said faulty loop data indicating said faulty minor loops is stored, is arranged at a position a predetermined number of bits apart from a page position in which the last bit of said header data is stored.

4,590,588

MONOLITHIC SEMICONDUCTOR MEMORY

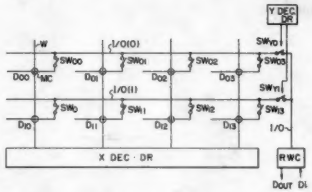
Kiyoo Itoh, Higashikurume, and Ryoichi Hori, Tokyo, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jul. 20, 1983, Ser. No. 515,519

Claims priority, application Japan, Jul. 21, 1982, 57-125687; Jan. 17, 1983, 58-4162

Int. Cl.[4] G11C *5/02*

U.S. Cl. 365—51 **11 Claims**



1. A monolithic semiconductor memory comprising:

a plurality of word lines adapted to be selectively driven by an address signal;

a plurality of first data lines each arranged to cross said word lines and divided lengthwise;

a plurality of memory cells each arranged at each of cross-points of said word lines and said first data lines and adapted to be coupled to a corresponding one of said first data lines when a corresponding one of said word lines is driven;

a plurality of second data lines each arranged for each of predetermined groups of said first data lines for exchanging data with selected ones of said first data lines through first switching means;

a one or more third data lines arranged orthogonally to said second data lines for exchanging data with selected ones of said second data lines through second switching means; and

read/write control means associated with said third data lines.

4,590,589

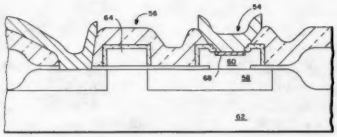
ELECTRICALLY PROGRAMMABLE READ ONLY MEMORY

Levy Gerzberg, Palo Alto, Calif., assignor to Zoran Corporation, Santa Clara and International Microelectronic Products Corporation, San Jose, both of, Calif.

Filed Dec. 21, 1982, Ser. No. 451,821

Int. Cl.[4] G11C *17/00*

U.S. Cl. 365—100 **6 Claims**



1. A programmable read only memory device comprising a plurality of active and passive circuit elements forming a memory cell, a plurality of voltage programmable resistor structures interconnecting said plurality of active and passive circuit elements, each of said programmable structures comprising a body of doped semiconductor material the bulk of which is characterized by first electrical conductance, said body having a contact surface and including a doped surface region abutting said contact surface, said doped surface region having a material structure characterized by a second electrical conductance lower than said first electrical conductance, electrical contact means engaging said contact surface, variable

voltage means interconnected to said electrical contact means for applying an operating voltage to said voltage programmable resistor structures which does not affect the electrical characteristics of said doped surface region and for applying a programming voltage of greater magnitude than said operating voltage which increases said second electrical conductance in a magnitude closer to said first electrical conductance, and address means for addressing and reading said memory device.

4,590,590

SONOBUOY MULTIPLE DEPTH DEPLOYMENT APPARATUS

James R. Toone, Fort Wayne, and Robert L. Barker, Ossian, both of Ind., assignors to Magnavox Government and Industrial Electronics Company, Fort Wayne, Ind.

Filed Nov. 29, 1983, Ser. No. 555,979
Int. Cl.[4] B63B *21/52*
U.S. Cl. 367—4 **11 Claims**

1. Deployment apparatus for a sonobuoy having a surface component and an underwater component comprising:

first means for containing a length of deployment cable coupled between the sonobuoy surface component and the sonobuoy underwater component;

second means for releasably attaching said first means to the surface component;

third means for releasably attaching said cable at a point intermediate of said cable length to said first means;

fourth means for selectively actuating said second means to release said first means from the surface component and actuating said third means to release the attachment of said cable from said first means whereby when neither said second means nor said third means is actuated said underwater component will be at a first depth, when said second means is actuated and said third means is not actuated said underwater component will be at a second depth and when said second means and said third means are actuated said underwater component will be at a third depth.

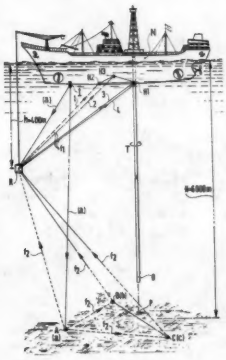
4,590,591

ACOUSTIC DISTANCE MEASURING APPARATUS AND METHOD OF USE

Claude Leroy, Bandol, and Guy Parent, Le Plessis Robinson, both of France, assignors to Sintra-Alcatel, Asnieres, France

Filed Jul. 21, 1983, Ser. No. 515,831
Claims priority, application France, Jul. 21, 1982, 82 12742
Int. Cl.[4] G01S *15/06*
U.S. Cl. 367—6 **7 Claims**

1. Acoustic distance measuring apparatus for measuring the distance of a vessel N from a vertical line through a fixed point P on the bottom of a body of water, the apparatus comprising: an acoustic emitter unit and at least three acoustic receiver units disposed on the bottom of the vessel beneath the surface of the water, said receiver units being disposed at the vertices of a plane polygon; at least three acoustic emitter/receiver units placed on the water bottom in the vicinity of said fixed point P, said emitter/receiver units being disposed at the vertices of a polygon; and the improvement wherein the measuring apparatus further includes a relay acoustic emitter/receiver submerged close to the vessel at a depth where vessel noise is highly attenuated, said relay receiving acoustic waves from the vessel's emitter and including means responding by emitting acoustic waves to the vessel's receiver units thereby enabling



the distances between the relay and each of the vessel's receiver units to be calculated, said bottom emitter/receiver units also receiving acoustic waves from the vessel's emitter and including means to respond in succession, i.e. after respective predetermined time delays, by emitting acoustic signals which are received by the relay and which are re-emitted therefrom after amplification to be received by one of the vessel's receiver units, thereby enabling the distances between the relay and each of the bottom emitter/receivers to be calculated on the basis of the different transit times for the signals from each bottom emitter/receiver, and further enabling the distance of the vessel from a vertical line through said fixed point to be calculated.

4,590,592

DISPLAY OF RESPONSE CHARACTERISTICS OF SEISMIC SOURCE ARRAYS

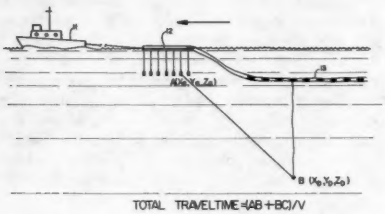
Bonita F. Bowman, Arlington; Keh Pann, Richardson, and Maynard S. Redeker, Dallas, all of Tex., assignors to Mobil Oil Corporation, New York, N.Y.

Filed Feb. 16, 1984, Ser. No. 580,928
Int. Cl.[4] G01V *1/38, 1/34*
U.S. Cl. 367—68 **8 Claims**

1. In seismic exploration wherein an array of seismic sources is moved along a line of exploration on the earth's surface and the reflections and/or refractions of seismic energy from said sources are recorded as seismograms, the method of displaying the response characteristics of said array comprising:

determining the amplitude response of said array at a plurality of locations at different azimuth angles and at different dip angles from said array;

selecting equal values of determined amplitude response; and



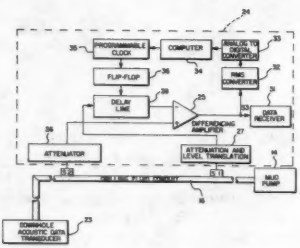
displaying contours of said equal values of amplitude response as a function of azimuth and dip angle in a stereoscopic polar projection.

4,590,593

ELECTRONIC NOISE FILTERING SYSTEM

Paul F. Rodney, Spring, Tex., assignor to NL Industries, Inc., New York, N.Y.

Filed Jun. 30, 1983, Ser. No. 509,487
Int. Cl.[4] G01V *1/36*
U.S. Cl. 367—83 **18 Claims**



1. An apparatus for use in borehole data transmission systems in which downhole data is transmitted by acoustic pulses propagated through drilling fluid contained within a fluid flow line, said apparatus comprising:

a pair of acoustic receiving transducers to be spaced one from another any distance on said flow line, each said transducer adapted for receiving said acoustic pulses propagating in said drilling fluid and producing a respective output signal in response thereto;

means for determining the difference in the output signals of said transducers; and

means for selectively delaying one of said output signals to said difference determining means as a function of said difference during the absence of downhole data transmission to minimize said difference and eliminate acoustic noise in said flow line.

4,590,594

SIDE-SPOT FOCUS APPARATUS FOR OPTICAL DISC RECORDING AND/OR PLAYBACK SYSTEM

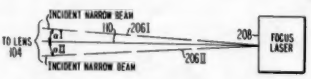
Charles W. Reno, Cherry Hill Township, Camden County, N.J., assignor to RCA Corporation, Princeton, N.J.

Filed Nov. 23, 1983, Ser. No. 554,729
Int. Cl.[4] G11B *7/00*
U.S. Cl. 369—45 **6 Claims**

1. An improved side-spot focus apparatus for an optical disc recording and/or playback system that includes an optical disc having a light-reflective surface oriented perpendicular to a given plane; said apparatus comprising:

first means including a focus laser for deriving first and second separate light beams respectively traveling toward said surface in a first beam direction and in a second beam direction, each of said first and second beam directions having a projected component thereof oriented parallel to said given plane, said projected component of said first beam direction in said given plane being oriented at a first oblique angle α_I with respect to and on a given side of a normal to said disc surface, said projected component of said second beam direction in said given plane being oriented at a second oblique angle α_{II} with respect to and on the side opposite from said given side of said normal to said disc surface, wherein α_I has a non-constant value equal to C plus or minus a pointing error Δ and α_{II} has a non-constant value C minus or plus said pointing error Δ, but the sum of α_I plus α_{II} has a substantially fixed constant value equal to 2C;

second means including an imaging lens having its optical



axis oriented substantially parallel to said given normal, said imaging lens being situated between said first means and said disc surface in the path of said first and second beams for illuminating said reflective surface of said disc with incident imaged first and second beams, each of said incident imaged first and second beams being focused on said disc surface only when the distance between said surface and said imaging lens has a given value;

third means including a set of photodetectors, responsive to the respective positions of each of said imaged first and second beams reflected from said disc surface and passed back through said imaging lens, for deriving an error signal that is dependent on the difference between the actual value of the distance from said imaging lens to said disc surface and said given value thereof and is independent of said pointing error Δ; and

fourth means including a lens mover responsive to said error signal for moving said imaging lens in a direction to minimize said difference between the actual value and given value of the distance from said imaging lens to said disc surface.

4,590,595

APPARATUS FOR DETECTING IN-BAND SINGLE FREQUENCY SIGNALING TONES FROM FDM CHANNELS

Yo Morimura, c/o NEC Corporation, 33-1, Shiba 5-chome, Minato-ku, Tokyo, Japan

Filed Mar. 26, 1984, Ser. No. 593,484
Claims priority, application Japan, Mar. 28, 1983, 58-50363; Mar. 28, 1983, 58-50364; Mar. 28, 1983, 58-50365
Int. Cl.[4] H04J *1/14, 3/12*
U.S. Cl. 370—76 **13 Claims**

1. An apparatus for detecting anyone of a plurality of in-band single frequency signaling tones from each of a plurality of frequency-division multiplexed channels, said apparatus comprising:

means for digitizing signals of said frequency-division multiplexed channels into a corresponding time-division multiplexed (TDM) signal having a series of frames, each frame being formed by a series of time slots corresponding in number to the number of said channels;

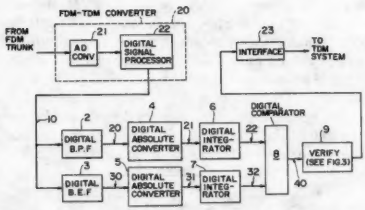
digital band-pass filter means for passing the components of said TDM signal having the frequencies of said signaling tones;

digital band-elimination filter means for eliminating the components of said TDM signal having the frequencies of said signaling tones;

first digital rectifier means for converting the output of said digital band-pass filter means into a first single-polarity TDM signal;

second digital rectifier means for converting the output of said digital band-elimination filter means into a second single-polarity TDM signal;

first digital integrator means for integrating said first single-polarity TDM signal;



a second digital integrator for integrating said second single-polarity TDM signal;

digital comparator means for generating a TDM signaling tone output when the output of said first integrator means is greater by a predetermined amount than the output of said second integrator means; and

verifying means for sequentially detecting the duration of a series of digital bits in each time slot of said TDM signaling tone output and for sequentially verifying that the detected duration exceeds a predetermined duration.

4,590,596

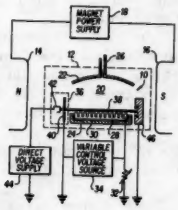
METHOD AND APPARATUS FOR MODULATING A DIFFRACTION RADIATION GENERATOR

Donald E. Wortman, Rockville, Md.; Herbert Dropkin, Washington, D.C., and Richard P. Leavitt, Berwyn Heights, Md., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed Jun. 15, 1984, Ser. No. 620,975

Int. Cl.[4] H01S *3/00*

U.S. Cl. 372—2 **10 Claims**



1. A method of generating and continuously modulating coherent near millimeter wavelength radiation in accordance with a modulation control signal, comprising the simultaneous steps of:

generating a ribbon electron beam by applying a negative voltage to a cathode of an electron gun having an anode connected to ground;

directing the ribbon beam to a collector connected to ground over a metallic reflecting diffraction grating which is disposed within an open resonator and which is connected to ground through a resistive element, whereby the grating-to-cathode voltage determining the amplitude and frequency of coherent radiation generated within the open resonator is the same as the voltage applied to the cathode in the absence of any other signal supplied to the diffraction grating; and

supplying the modulation control signal to the diffraction grating, to vary the grating-to-cathode voltage over a selected voltage range determined by the cathode voltage and the maximum and minimum values of the modulation control signal, the cathode voltage and the maximum and minimum values of the modulation control signal being selected such that a first parameter of the two coherent radiation parameters of amplitude and frequency will vary with the grating-to-cathode voltage over the selected voltage range and the second parameter of the two coherent radiation parameters will remain approximately constant over the selected voltage range.

4,590,597

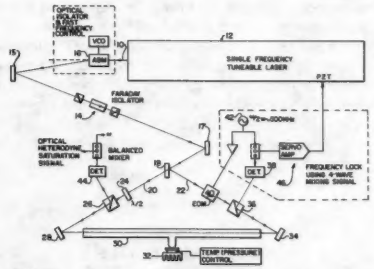
MODULATION TRANSFER SPECTROSCOPY FOR STABILIZING LASERS

Ma Long-sheng, Shanghai, China; Leo Hollberg, Red Bank, N.J.; Jon H. Shirley, and John L. Hall, both of Boulder, Colo., assignors to The United States of America as represented by the Secretary of Commerce, Washington, D.C.

Filed May 21, 1984, Ser. No. 612,291

Int. Cl.[4] H01S *3/13*

U.S. Cl. 372—32 **12 Claims**



1. A method of stabilizing a laser to a sub-Doppler resonance of an absorbing gas contained in a cell located external to the laser resonator, said method comprising the steps of:

splitting the laser beam into two beam portions, namely, a first probe beam for unmodulate probing of the cell and a second saturation beam for saturation with optical sideband frequencies;

directing the first beam through the absorbing gas in the cell;

frequency-modulating the second beam to produce sideband optical frequencies;

directing the modulated second beam through the cell coaxial with and antiparallel to the first beam where the absorbing gas causes the beams to interact in the cell and a cell modulation of both beams to result;

detecting the resultant cell modulation of one of the two beams portions exiting from the cell; and

stabilizing the laser using feedback of the detected cell modulation of the one beam portion.

4,590,598

PULSED LASER SYSTEM

Dale G. O'Harra, II, Belmont, Calif., assignor to Britt Corporation, Los Angeles, Calif.

Filed Jun. 13, 1984, Ser. No. 620,344

Int. Cl.[4] H01S *3/00*

U.S. Cl. 372—38 **19 Claims**

1. A pulse laser system comprising:

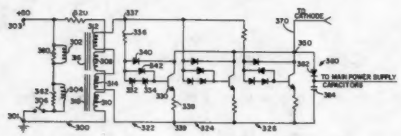
a laser for providing laser outer pulses to a target, the pulse

width and repetition rate of which are controllable in response to the pulse width and repetition rate of periodic input control signals;

a control circuit for generating said input control signals with pulse widths and repetition rates each selected from an associated predetermined range, said control circuit comprising:

operator input means for allowing an operator to control the output of said laser by selecting input parameters from a plurality of different input parameters comprising output power, pulse repetition rate and a plurality of modes of operation; and

means for automatically generating input control signals having a first fixed pulse width in response to operator



selection of a first one of said plurality of modes, and for automatically generating input control signals having a pulse width less than or equal to a second predetermined pulse width and a pulse repetition rate chosen from said associated predetermined range in response to selection of output power and a second one of said modes by said operator; said generating means further comprising: a microprocessor controller coupled to said operator input means; a first circuit means responsive to said microprocessor controller for generating pulse repetition signals; and a second circuit means for generating a pulse with a predetermined pulse width in response to said microprocessor controller and to each of said pulse repetition signals.

4,590,599

GAS LASER DEVICE

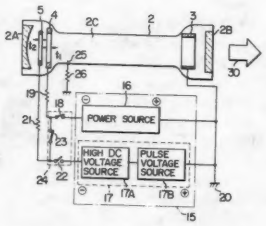
Yukio Kawakubo; Hiroyuki Sugawara; Kouji Kuwabara, all of Hitachi; Toshiharu Shirakura, Ibaraki; Satoshi Takemori, and Kouji Sasaki, both of Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 31, 1983, Ser. No. 499,244

Claims priority, application Japan, Jun. 2, 1982, 57-93211

Int. Cl.[4] H01S *3/097*

U.S. Cl. 372—87 **9 Claims**



1. A gas laser device comprising:

a discharge tube having a gas medium sealed therein and having reflection mirrors at opposite ends thereof;

a pair of anode means and cathode means arranged opposite to each other in said discharge tube between said reflection mirrors, said cathode means including a plurality of cathode members each of which has a predetermined discharge effective cathode surface and being electrically isolated from each other;

D.C. power source means having one terminal thereof connected to said anode means;

pulse power source means having one terminal thereof connected to said anode means; and

switching means inserted between the other terminals of said D.C. and pulse power source means and said cathode means, said switching means connecting said D.C. power source means to at least one first selected cathode member of the plurality of cathode members of said cathode means in a continuous wave oscillation mode to cause a continuous glow discharge between said anode means and said at least one first selected cathode member while connecting said pulse power source means to at least one second selected cathode member of the plurality of cathode members of said cathode means in a pulsed oscillation mode to cause a pulsed glow discharge between said anode means and said at least one second selected cathode member, the total area of the discharge effective cathode surface of said at least one second selected cathode member being smaller than that of the discharge effective cathode surface of said at least one first selected cathode member.

4,590,600

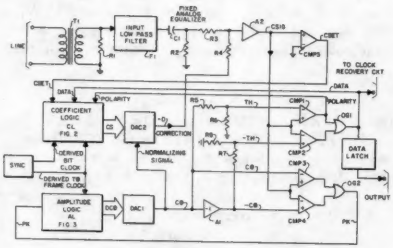
DYNAMIC DIGITAL EQUALIZER

Robert H. Beeman, Scottsdale, and Paul U. Lind, Phoenix, both of Ariz., assignors to GTE Communication Systems Corporation, Northlake, Ill.

Filed Oct. 25, 1984, Ser. No. 664,623

Int. Cl.[4] H04B *1/10*

U.S. Cl. 375—99 **22 Claims**



1. An arrangement for the recovery of digital data from an incoming data stream where such data is preceded by a single sync pulse header and comprising:

receiving means for receiving an incoming digital signal and having an output for connection to other circuits, signal level comparator means operated upon receipt of an incoming signal sync pulse from said receiving means of a level exceeding an established level to output a control signal,

amplitude logic means operated to count the number of said control signals and to output a digital count of said number, and

first digital to analog convertor means operated responsive to said digital count to convert said digital count to an analog level to serve as said established level, said receiving means including an amplifier operatively connected to a comparison means, to amplify an incoming signal, said, comparison means operated to produce a set signal upon detecting any voltage deviation from a set comparison level, a first, a second and a third register means operated to register each occurrence of said set signal occurring respectively at a first, second or a third discrete bit time after said sync pulse,

first connect means operatively connecting said set signal to said registers,

a frame clock pulse source operated to output an enabling signal to said registers to indicate said respective first, second, and third bit times following said sync pulse,

first, second and third gate means respectively, operatively associated with said register means and operated to pass said register contents,

and first, second and third arithmetic means connected in tandem and respectively operatively connected to receive said respective register content via said respective gate means said third arithmetic means providing a summed digital count,

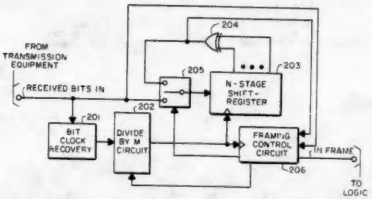
other digital to analog converter means operatively connected to receive said first digital to analog converter established level and said third arithmetic means to receive said summed digital count and convert said count to a second analog level, said second analog level inputted to said amplifier to correct said receiving means output.

4,590,601

PSEUDO RANDOM FRAMING DETECTOR CIRCUIT

Robert H. Beeman, Scottsdale, Ariz., assignor to GTE Communication Systems Corporation, Phoenix, Ariz.

Filed Dec. 24, 1984, Ser. No. 685,702
Int. Cl.[4] H04J 3/06; H04L 7/08
U.S. Cl. 375—115 **7 Claims**



1. In a digital telecommunications system, a pseudo random framing detector circuit for recovering periodic framing data and transmitting said framing data to logic of said system, said framing data being interleaved with transmission data received from another digital telecommunications system via transmission equipment, said pseudo random framing detector circuit comprising:

clock means connected to said transmission equipment and being operated to produce a periodic clock signal of a predetermined frequency in response to said interleaved data;

frame sizing means connected to said clock means and being operated in response to said periodic clock signal to produce a second periodic signal of a period equal to the length in bits of said framing data and said transmission data;

gating means;

shift-register means connected to said frame sizing means and, via a switching means, to said transmission equipment, said shift-register means including a plurality of tap outputs and an input, said shift-register means being cyclically operated in response to said second periodic signal to produce a plurality of tap output signals on said corresponding plurality of tap outputs, at least two of said tap outputs being connected to said gating means and each said connected tap output being a logic one bit positional representation corresponding to any polynomial of maximal length for a particular size of said shift-register means;

said gating means connected to said logic one bit positions of said tap outputs, said gating means being cyclically operated in response to said connected tap output signals to produce said framing data;

framing control means;

said switching means connected to said transmission equipment, to said framing control means, to said gating means and to said input of said shift-register means, said switching means being operated in response to said framing control means to connect said gating means to said input of said shift-register means or said switching means being operated in response to said framing control means to connect said transmission equipment to said input of said shift-register means;

said framing control means further connected to said frame sizing means, said framing control means being operated to select said switching means to input said framing data to said shift-register means or to input said interleaved data to said shift-register means; and

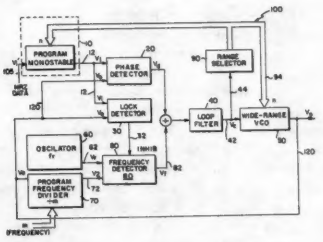
said framing control means connected to said logic and being further operated to transmit said framing data to said logic of said system.

4,590,602

WIDE RANGE CLOCK RECOVERY CIRCUIT

Dan H. Wolaver, Worcester, Mass., assignor to General Signal, Stamford, Conn.

Filed Aug. 18, 1983, Ser. No. 524,325
Int. Cl.[4] H03D 3/24
U.S. Cl. 375—120 **12 Claims**



1. A wide frequency range, random variable data rate clock signal recovey circuit for digital data communications receiver comprising:

data input means for receiving input data signals;

phase lock loop means connected to said data input means and receiving input signals therefrom for clock signal recovery and including voltage controlled oscillator means for generating output signals and signals utilized within said phase lock loop means and phase detector means having at least a first input from said data input means and a second input from said voltage controlled oscillator means for comparing the phase of said first and second input signals and outputting signals to said voltage controlled oscillator means representative of the difference between said first and second input signals;

means for generating reference signals distinct from the output of said voltage controlled oscillator means;

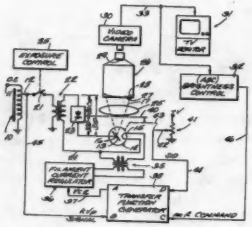
frequency synthesizer means receiving as inputs said reference signals and output signals of said voltage controlled oscillator means and being connected in a loop with said voltage controlled oscillator means of said phase lock loop means for initially controlling said voltage controlled oscillator means to produce signals which estimate the frequencies of said input data signals to a level of accuracy within the seizure bandwidth of said phase lock loop means; and

lock detector means having at least a first input from said data input means and a second input from said voltage controlled oscillator means for producing a signal to said frequency synthesizer means for disabling the output of said frequency synthesizer means in response to the difference between said first and second input signals to said lock detector means being within said bandwidth of said phase lock loop means.

4,590,603
AUTOMATIC X-RAY ENTRANCE DOSE COMPENSATION

Gary F. Relihan, Nashotah; Joseph J. Grass, Brookfield, and Jerry L. Neitzell, Mukwonago, all of Wis., assignors to General Electric Company, Schenectady, N.Y.

Filed Jan. 9, 1984, Ser. No. 569,179
Int. Cl.[4] H05G *1/44, 1/34*
U.S. Cl. 378—108 **5 Claims**



1. An X-ray apparatus comprising:

X-ray image receptor means having an X-ray image input plane; an X-ray tube having a filament and an anode on which a focal spot is produced when current (mA) flows through the tube, said tube being movable for varying the focal spot-to-image plane distance (SID) between a minimum and a maximum and being operative to project an X-ray beam from said spot through the X-ray entrance plane of the examination body to the receptor image input plane; an X-ray power supply and control means for selectively varying the peak kilovoltage (kVp) applied to the anode of said tube for making an X-ray exposure; and, the improvement for maintaining a constant permissible maximum X-ray dose rate (R/min) at said entrance plane during fluoroscopy for various values of kVp and SID, comprising:

means for adjusting the X-ray tube filament current at a predetermined first rate as SID is changed and concurrently modifying said first rate as kVp is changed such that the X-ray tube current will result in an R/min at said entrance plane that will not exceed said maximum permissible R/min at minimum SID and will remain constant up to substantially maximum SID.

4,590,604
VOICE-RECOGNITION ELEVATOR SECURITY SYSTEM

Michal M. Feilchenfeld, Pittsburgh, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.

Filed Jan. 13, 1983, Ser. No. 457,788
The portion of the term of this patent subsequent to Aug. 6, 2002, has been disclaimed.
Int. Cl.[4] G10L *1/00*
U.S. Cl. 381—42 **5 Claims**

1. A voice-controlled elevator security system, including at least one elevator car mounted in a building having a plurality of floors, including a lobby floor, wherein authorized users are each pre-enabled to gain access to a predetermined floor, or floors, of the building from the lobby floor and each authorized user has provided template utterances, said voice-controlled elevator security system comprising:

first memory means for storing template utterances of authorized users, with said template utterances being represented by a plurality of binary bits;

second memory means for storing preselected floors to which each authorized user is permitted access;

digitizing means for digitizing a prospective user's spoken utterance, with the user's digitized spoken utterance being represented by a plurality of binary bits;

modification means;

switch means actuatable by a prospective user for activating said modification means;

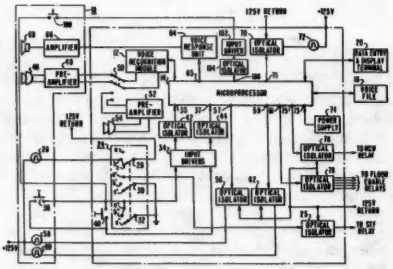
said modification means, when actuated, providing modified template utterances of an authorized user in response to the digitized spoken utterance of a prospective user, and to the template utterances stored in said first memory means, with the modified template utterances being represented by a plurality of binary bits;

third memory means for storing said modified template utterances;

recognition means for comparing the prospective user's digitized spoken utterance with the template utterances stored in the first memory means, when said modification means is deactivated, to determine the largest number of binary bits in agreement between the digitized spoken utterance of the prospective user and the template utterances stored in said first memory means;

said recognition means comparing the prospective user's digitized spoken utterance with the modified template utterances stored in said third memory means, when said modification means is activated, to determine the largest number of binary bits in agreement between the digitized spoken utterance of the prospective user and the template utterance stored in said third memory means;

threshold means for establishing a threshold limit;



comparator means for comparing said largest number of binary bits in agreement determined by said recognition means with said threshold limit and for producing an enable signal when said largest number of binary bits in agreement exceeds said threshold limit;

said enable signal indicating that the prospective user is an authorized user;

and call selecting means responsive to said enable signal for enabling a recognized authorized user to gain access to an elevator car at the lobby floor;

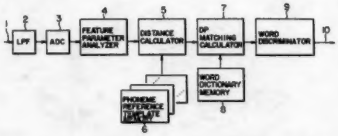
said call selecting means further being responsive to said enable signal for enabling the recognized authorized user to direct the accessed elevator car only to an associated pre-enabled floor stored in said second memory means;

said call selecting means including floor selecting means in the at least one elevator car and up-call selecting means at the lobby floor, wherein activation of the voice controlled elevator security system disables the floor selecting means in the at least one elevator car, except the floor selecting means for the lobby floor and disables the up-call selecting means on the lobby floor, and wherein indentification of the user as an authorized user automatically activates the up-call selecting means at the lobby floor and enables the floor selecting means in the at least one elevator car for said pre-enabled floors.

4,590,605
METHOD FOR PRODUCTION OF SPEECH REFERENCE TEMPLATES

Nobuo Hataoka, Hachioji, and Akira Ichikawa, Musashino, both of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Dec. 14, 1982, Ser. No. 449,660
Claims priority, application Japan, Dec. 18, 1981, 56-203731
Int. Cl.⁴ G10L *1/00*
U.S. Cl. 381—43 **3 Claims**



1. A method for production of speech reference templates for phoneme groups for use in speech recognition, each of said phoneme groups containing at least one phoneme, the method comprising the steps of:

preparing first speech patterns with respect to speeches of plural speakers, said first speech patterns corresponding to a word which is stable by utterance;

classifying said speeches of said plural speakers into speech groups by use of differences in said first speech patterns caused by physical features of said speakers;

preparing second speech patterns with respect to said speeches of said plural speakers, said speech patterns corresponding to a phoneme group containing at least one phoneme;

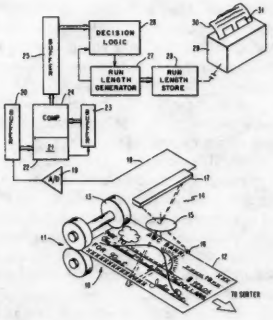
subclassifying the speeches of said plural speakers in each of said speech groups into speech subgroups by the use of differences in said second speech patterns caused by features of speech occurring by utterance; and

selecting a plurality of second speech patterns among the second speech patterns in each of said speech subgroups and assigning said selected plurality of second speech patterns to be the speech reference template for each of said phoneme groups.

4,590,606
MULTI-FUNCTION IMAGE PROCESSING SYSTEM

Gene D. Rohrer, Concord, N.C., assignor to International Business Machines Corporation, Armonk, N.Y.

Filed Dec. 13, 1982, Ser. No. 449,287
Int. Cl.⁴ G06K *9/00, 9/40*
U.S. Cl. 382—7 **12 Claims**



1. An image processor for transforming an optically perceptible input image into an electronic equivalent output image having binary valued picture elements, the processor including means for developing scan lines of signals representing, as a magnitude within a multi-valued scale of magnitudes, the optical density of picture elements of the input image, wherein the improvement comprises:

an input store comprising a plurality of first storage locations for storing representations of the magnitude signals of input image picture elements for a plurality of said scan lines;

a transition store having a plurality of second storage locations for storing transformed representations of picture elements corresponding to input image picture elements;

transforming means operative in response to the contents of selected storage locations of said input store for creating said transformed picture element representations in said transition store, and with the transformed picture elements being represented in said transition store by one of a group of at least two values, said transforming means comprising

means for calculating the sum of the absolute values of the difference in magnitude signals of selected pairs of picture elements of a group bearing a predetermined adjacency relationship to picture elements being classified, and producing a calculation output,

first characterization means for classifying picture elements of the input image in response to whether the calculation output exceeds a threshold value,

second characterization means for classifying picture elements of the input image in accordance with the algebraic sign of the two dimensional second derivative of magnitude with respect to distance at picture elements being classified, and

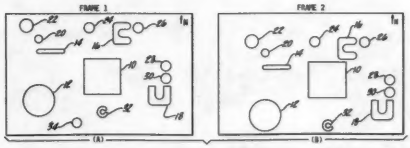
means responsive to a predetermined relationship of the classifications of picture elements by said first and second characterization means for recording selected ones of said group of values at corresponding storage locations in said transition store; and

means for testing the proximity and relationship of adjacent differing values in said transition store and for producing the binary value electronic output image.

4,590,607
IMAGE CORRESPONDENCE TECHNIQUES USING SERIAL NEIGHBORHOOD PROCESSING

Richard J. Kauth, Ypsilanti, Mich., assignor to Environmental Research Institute of Michigan, Ann Arbor, Mich.

Continuation-in-part of Ser. No. 419,259, Sep. 17, 1982, abandoned. This application Jul. 16, 1985, Ser. No. 755,706
Int. Cl.⁴ G06K *9/36*
U.S. Cl. 382—41 **4 Claims**



1. A method of detecting correspondence between multiple frames of image data, each frame represented by a matrix of pixels, said method comprising the steps of:

transforming the matrix representing a first frame of image data in at least one serial neighborhood processing stage by a predetermined number of electronic erosion sequences thereby reducing the matrix to a plurality of discrete islands of pixels;

transforming the matrix representing a second frame of image data in at least one serial neighborhood processing stage by performing the predetermined number of electronic erosion sequences to reduce the matrix associated with the second frame to a plurality of discrete islands of pixels;

removing, from the matrix representing the first frame of

image data, all discrete islands of pixels which consist of a plurality of pixels, to leave a first transformed matrix containing a first plurality of single points of nonconnected pixels;

removing, from the matrix representing the second frame of image data, all discrete islands of pixels which consist of a plurality of pixels, to leave a second transformed matrix containing a second plurality of single points of nonconnected pixels;

storing, for each of the two pluralities of single points, the coordinates of the single points; and

labeling each single point in a transformed matrix having exactly one single point in the other transformed matrix satisfying a predetermined spatial relationship with its location in the other transformed matrix,

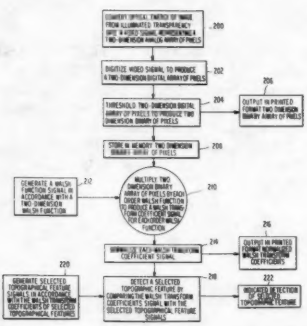
whereby the correspondence between multiple frames of image data is detected.

4,590,608

TOPOGRAPHIC FEATURE EXTRACTION USING SENSOR ARRAY SYSTEM

Pi-Fuay Chen, Alexandria; William W. Seemuller, Springfield, and Frederick W. Rohde, Fairfax Station, all of Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.

Filed May 30, 1980, Ser. No. 154,661
Int. Cl.[4] G06K 9/52
U.S. Cl. 382—43 **105 Claims**



1. Apparatus comprising:

a. means for converting optical energy of an image into a video signal;

b. means for generating a Walsh function signal in accordance with the equation:

$$a(i,j) = \frac{1}{nm} \sum_{k=1}^{n} \sum_{l=1}^{m} f(k,l)Wal(i,k)Wal(j,l),$$

where: a(i,j) is said Walsh transform coefficients signal; i and j indicate the order of said Walsh function signal; and n and m are integers; and f(k,l) is said video signal; and

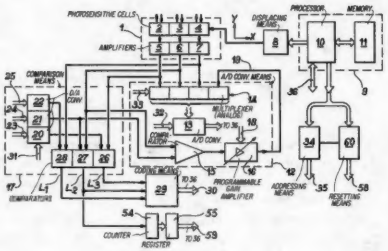
c. means for multiplying said video signal with said Walsh function signal to produce a Walsh transform coefficient signal indicative of the decomposed spectral components of said image.

4,590,609

SYSTEM FOR THE ACQUISITION OF DATA INSCRIBED ON A SUPPORT

Jean Chevalet, Paris, and Robert Reeves, Montigny le Bretonneux, both of France, assignors to Centre National de la Recherche Scientifique, Paris, France

Filed May 26, 1983, Ser. No. 498,570
Claims priority, application France, Jun. 4, 1982, 82 09749
Int. Cl.[4] G06K 9/38
U.S. Cl. 382—50 **19 Claims**



1. A system for the acquisition of data inscribed on a support incorporating: detection means sensitive to the different electromagnetic, radiation intensities of predetermined wavelengths, coming from data inscribed on a support, said detection means supplying on outputs, analog signals whose amplitudes are respectively dependent on the radiation intensities; means for displacing the detection means at least in an area containing the data to be acquired, said displacement depending on the amplitude of said analog signals; control and processing means comprising a processor connected to the means for displacing the detection means and to a memory; analog-digital conversion means receiving the analog signals during the displacement of the detection means in order to supply at an output digital values corresponding respectively to the said amplitudes; the memory containing control instructions for the means for displacing the detection means relative to a fixed coordinate, as well as processing and addressing instructions for the digital values related to the coordinates of the data; wherein the analog-digital conversion means comprise an analog-digital converter, and programmable means for amplifying the amplitudes of the analog signals supplied to the analog-digital converter, said amplification being performed on the basis of a predetermined reference amplification amplitude, the gain of these amplification means being programmable by the processor and dependent on a desired scale of digital values at the output of the analog-digital converter; the system also comprising comparison means with logic outputs for comparing instantaneous values of said amplitudes of the analog signals with mean reference comparison amplitude values, during the displacement of the detection means, the outputs of said comparison means supplying a signal having states or logic state changes representing the instantaneous transitions of radiation intensities caused by the acquisition of data by the cells during their displacements; the detection means comprising at least one median photosensitive cell and two photosensitive cells on either side of the median cell; the reference amplification and comparison amplitudes being determined during a displacement of the cells permitting a prior scanning of the zone containing the data to be acquired; said detection means also comprising output amplifiers, inputs of these amplifiers being respectively connected to the outputs of the cells, outputs of said amplifiers respectively supplying the said analog signals; the reference amplification amplitude being determined by the processor from amplitudes of the analog signal supplied by the output amplifier corresponding to the median photosensitive cell, during the prior scanning; the mean reference comparison amplitudes being respectively determined by

the processor, on the basis of the amplitudes of the signal respectively supplied by said output amplifier during the prior scanning.

4,590,610

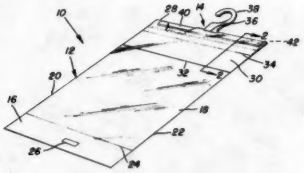
HANGING PRODUCT DISPLAY PACKAGES

Steven B. Rhyne, Chattanooga, Tenn., assignor to Rhyne & Company, Chattanooga, Tenn.

Filed Feb. 14, 1985, Ser. No. 701,378

Int. Cl.[4] B65D *33/14*

U.S. Cl. 383—23 **2 Claims**



1. A hangable display package including a plastic bag for containing an article of merchandise and a rigid hanger for hangably supporting the bag from a rod or the like, said hanger comprising a hook member and a pair of arms having upper and lower edges disposed below and extending away from the hook in opposite directions, said bag having a closed top formed by superposed layers of a sheet of material forming a front surface and folded to form a flap extending partly in superposed relationship relative to said front surface, another sheet of plastic material forming the rear surface of said bag and being partly disposed intermediate said front surface and said flap in superposed relationship with said front surface, said front surface, rear surface and flap being secured together at common edges defining the sides of the package, a slit formed in the rear surface above the lower edge of the flap to permit an entry into the bag protected by the flap, an upper peripheral edge of the bag defined at the fold, an opening formed in the central portion of said peripheral edge, said hanger being disposed within said bag with said hook projecting outside of the bag through said opening, and the upper edges of said arms abutting said peripheral edge when said hanger supports the bag, and said front surface, rear surface and flap being fixedly joined together at a location above the slit and beneath the lower edges of said arms to secure the hanger in the bag without closing entry through the slit into the bag.

4,590,611

TUNER FOR COMMUNICATIONS EQUIPMENT

Gerhard Maier, Dauchingen, and Joachim Lange, Villingen-Schwenningen, both of Fed. Rep. of Germany, assignors to Deutsche Thomson-Brandt GmbH, Villingen, Fed. Rep. of Germany

Filed Jan. 31, 1984, Ser. No. 575,522

Claims priority, application Fed. Rep. of Germany, Feb. 4, 1983, 3303711

Int. Cl.[4] H03J *7/20*; H04B *1/18*

U.S. Cl. 455—166 **10 Claims**

1. An electronic tuning unit for communications equipment such as radio and television sets comprising

an antenna for receiving electromagnetic communication signals;

an antenna input connected to the antenna;

a phase-locked loop tuning system for generating an oscillator frequency for tuning an apparatus separately wherein a desired oscillator frequency of the phase locked loop is varied by changing the divider ratio of a programmable divider disposed in the phaselocked loop;

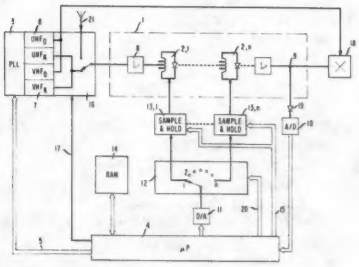
a first switching means which in each case of a selection of a receiver channel connects an assigned frequency to its output and which otherwise connects the antenna input to its output;

high frequency filter circuits connected to the output of the first switching means;

a rectifying means connected to the output of the high frequency filter circuits having an output;

a microprocessor connected to the output of the rectifying means and having an output connected to the phase locked loop tuning system;

a digital-analog converter having an input connected to an output of the microprocessor and having an output;



a second switching means having an input connected to the output of the microprocessor via said digital to analog converter and having output provisions for feeding a controlled analog signal corresponding to a microprocessor output; and

an intermediate memory storage having an input connected to the output provisions of the second switching means and having an output connected to the high frequency filter circuits.

4,590,612

ELECTRONIC TUNER HAVING SELECTABLE BAND SECTIONS APPROPRIATELY BIASED TO MIXER/AMPLIFIER

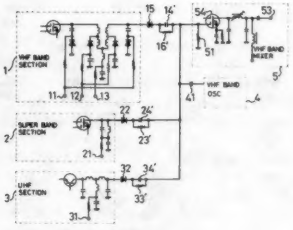
Sadayoshi Ijichi, Soma, Japan, assignor to Alps Electric Co., Ltd., Japan

Filed Apr. 25, 1983, Ser. No. 488,098

Claims priority, application Japan, Apr. 28, 1982, 57-62798[U]

Int. Cl.[4] H03J *5/24*

U.S. Cl. 455—190 **1 Claim**



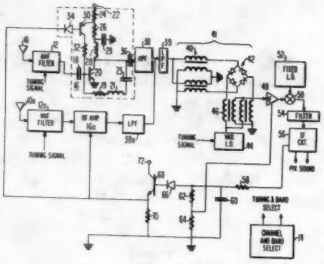
1. In an electronic tuner having means including a VHF band section for processing signals in the VHF band to produce an output signal, means including a UHF band section for processing signals in the UHF band to produce an output signal, means including a super band section for processing signals in the super band to produce an output signal, and common means including a transistor circuit for mixing said

output signal from said VHF band section with a local oscillation signal to produce an intermediate frequency signal during operation for VHF signals and amplifying either said output signal from said UHF band section or said output signal from said super band section during operation for UHF signals or super band signals, the improvement including bias means for applying a bias voltage of one level to said transistor circuit when mixing output signals from said VHF band section and a bias voltage of another level to said transistor circuit when amplifying said output signals of said UHF band section or said output signals from said super band section, said bias means including a respective diode and resistor pair connected in series between said common means and each of, said VHF band section, said UHF band section, and said super band section, and further including respective coupling capacitors, each coupled in parallel with a respective resistor for coupling the output of each said section to said common means.

4,590,613
BIPOLAR AGC WITH RF TRANSISTOR DC BIAS POINT STABILIZATION

George F. Tannery, IV, Greenfield, Ind., assignor to RCA Corporation, Princeton, N.J.

Filed Dec. 23, 1983, Ser. No. 564,911
Int. Cl.[4] H04B *1/26;* H03G *3/30*
U.S. Cl. 455—200 **11 Claims**

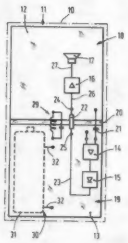


1. A double conversion television tuner comprising:
an input for RF signals;
a point of reference potential;
a first amplifier including a first bipolar transistor arranged as a common emitter amplifier with a base coupled to said RF input, an emitter coupled to said point of reference potential, and a collector;
a variable frequency local oscillator having an output;
a doubly balanced mixer, including first and second baluns having respective unbalanced inputs coupled to respective ones of said collector of said first amplifier and said output of said variable local oscillator, respective balanced outputs, a mixing element coupled to said balanced outputs, an an output;
a second amplifier having an input coupled to said output of said doubly balanced mixer, and an output;
a fixed frequency local oscillator having an output;
a second mixer having a first input coupled to said output of said second amplifier, a second input coupled to said output of said fixed local oscillator, and an output;
AGC means, coupled to said output of said second mixer, for providing an automatic gain control voltage; and
varying means DC coupled between the base and collector electrodes of said transistor for providing feedback therebetween and receiving said automatic gain control voltage for varying the base bias current in accordance with said automatic gain control voltage and thereby varying the gain of said amplifier, wherein said varying means includes a second bipolar transistor of opposite conductivity type with respect to said first bipolar transistor having an emitter DC coupled to the collector of said first bipolar transistor, a collector DC coupled to the base of said first bipolar transistor and a base coupled to said AGC means to receive said AGC voltage.

4,590,614
DIPOLE ANTENNA FOR PORTABLE RADIO

August Erat, Berlin, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany

Filed Jan. 16, 1984, Ser. No. 571,078
Claims priority, application Fed. Rep. of Germany, Jan. 28, 1983, 3302876
Int. Cl.[4] H04B *1/08;* H01Q *1/24*
U.S. Cl. 455—270 **7 Claims**

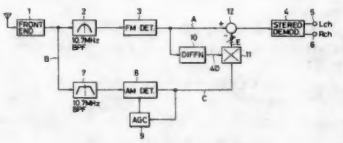


1. A dipole antenna for a portable radio comprising an insulated housing, in which is disposed a printed circuit board supporting high-frequency (**14,15**) and low-frequency (**16,17**) elements, said circuit board having conductive tracks and conductive surfaces thereon,
the conductive tracks and surfaces (**12,13**) as well as the high-frequency and low-frequency elements (**14, 15, 16**) are located on two separate regions of said circuit board, electrically isolated and divided from each other, each forming a dipole half (**18,19**),
a dipole tuning circuit (**29**) for electrically connecting
the conductive surfaces of the dipole halves (**18,19**), and high-impedance resistance means (**22**) for connecting the high-frequency elements (**14,15**) on one region (**13**) with the low-frequency elements (**16,17**) on the other region (**12**).

4,590,615
MULTIPATH DISTORTION REDUCING CIRCUIT

Kiyoshi Ohtaki, and Kohji Ishida, both of Tokyo, Japan, assignors to Pioneer Electronic Corporation, Tokyo, Japan

Filed Jun. 19, 1984, Ser. No. 622,336
Claims priority, application Japan, Jul. 6, 1983, 58-122505
Int. Cl.[4] H04B *1/10*
U.S. Cl. 455—304 **4 Claims**



1. A multipath distortion reducing circuit comprising:
means for receiving an FM signal;
AM detection means for detecting an envelope of said FM signal;
AGC circuit means coupled to said AM detecting means for causing an output of said AM detecting means to be constant, irrespective of a magnitude of said FM signal;
FM detecting means for FM detecting said FM signal;
means for differentiating an output of said FM detecting

means for shifting said output of said FM detecting means by 90° in phase and imparting a frequency characteristic to said output of said FM detecting means such that a level of said output of said FM detecting means increases as the frequency thereof increases;

multiplier means having inputs receiving an output of said differentiating means and said output of said AM detecting means for forming a cancelling signal by multiplying said output of said differentiating means and said output of said AM detecting means; and

adding means for adding said cancelling signal to said output of said FM detecting means to provide an output signal haveing reduced multipath distortion.

4,590,616

RE-TUNING DEVICE COMPRISING A SWITCHING MIXER STAGE AND A TUNING OSCILLATOR

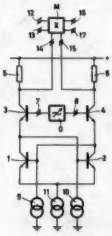
Hendrik F. van Glabbeek, Eindhoven, Netherlands, assignor to U.S. Philips Corporation, New York, N.Y.

Filed Jul. 6, 1984, Ser. No. 628,174

Claims priority, application Netherlands, Jul. 12, 1983, 8302481

Int. Cl.⁴ H04B *1/26*

U.S. Cl. 455—319 **3 Claims**



1. An RF-tuning device comprising a switching mixer stage for receiving an RF-input signal and a tuning oscillator coupled to an oscillator signal inpu thereof, characterized in that a bistable trigger circuit is connected between the tuning oscillator and the switching mixer stage oscillator signal input to increase the slew rate of an oscillator signal applied to said switching mixer stage oscillator signal input, wherein said bistable trigger circuit is actuated by zero crossings in an output signal of the tuning oscillator causing said bistable trigger circuit to generate a substantially square-wave output signal for application to said mixer stage as said oscillator signal.

4,590,617

HERMETICALLY SEALED PLANAR STRUCTURE FOR HIGH FREQUENCY DEVICE

Erich H. Kraemer, Clearwater, Fla., assignor to Sperry Corporation, New York, N.Y.

Filed Jan. 30, 1984, Ser. No. 574,824

Int. Cl.⁴ H04B *1/26*; H01L *23/02*; H05K *5/00*

U.S. Cl. 455—328 **27 Claims**

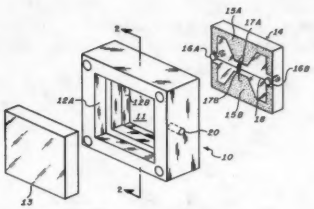
1. A hermetically sealed integrated circuit, comprising:

first and second dielectric substrate means spaced apart, at least portions thereof transparent to incident radio frequency energy,

conductive frame means having an aperture disposed therein for transmittal of said incident radio frequency energy and means for supporting said first and second dielectric substrate means in parallel planes,

conductive layer means disposed on said first substrate means within said aperture, for receiving said radio frequency energy incident upon said first or second substrate means,

at least one discrete component coupled to said conductive layer means and disposed between said spaced substrates for interacting with said energy at a first radio frequency, and



means for sealing said first and second dielectric substrate means to said frame means to provide a hermetically sealed chamber enclosing said component.

4,590,618

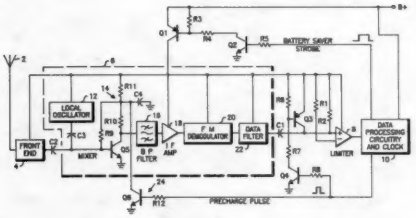
RECEIVER HAVING REFERENCE VOLTAGE STABILIZATION CIRCUITRY

Michael C. Heath, and Leonard E. Nelson, both of Plantation, Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Mar. 13, 1984, Ser. No. 589,270

Int. Cl.⁴ H04B *1/16*

U.S. Cl. 455—343 **5 Claims**



5. A circuit, for use with a receiver having a receiver section and a data limiter, said circuit including in combination:

means for coupling said receiver section to said data limiter;

a battery saver means for periodically supplying power, during a power ON time, to said receiver section;

means for precharging said coupling means during said power ON time to set a predetermined level for said coupling means; and

switch means for preventing said receiver from applying a received data signal to said coupling means during a portion of said power ON time.

4,590,619

STAR COUPLER FOR LOCAL NETWORKS OF OPTICAL COMMUNICATIONS SYSTEM

Gerhard Winzer, Putzbrunn, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin & Munich, Fed. Rep. of Germany

Filed May 7, 1984, Ser. No. 607,813

Claims priority, application Fed. Rep. of Germany, Jun. 28, 1983, 3323317

Int. Cl.⁴ H04B *9/00*

U.S. Cl. 455—612 **20 Claims**

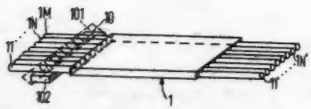
1. Star coupler apparatus for connection and coupling between a plurality of incoming light waveguides and a plurality of outgoing light waveguides, comprising:

a passive star coupler including a mixing plate for distributing optical signals transmitted by transmitters in a plural-

ity of subscriber stations coupled to the incoming light waveguides through said mixing plate;

an additional optical transmitter coupled to said mixing plate; and

listening means optically coupled to the incoming light waveguides and operable to control said additional optical



transmitter, said listening means comprising an output coupling device for partially coupling optical signals incoming from the incoming light waveguides, said output coupling device comprising a semitransmissive reflector arranged in the light paths of the incoming light waveguides.

4,590,620

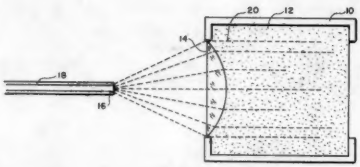
OPTICAL TELEPHONE

Nathan W. Feldman, 910 Van Court Ave., Elberon, N.J. 07740

Filed Oct. 17, 1985, Ser. No. 788,365

Int. Cl.[4] H04B *9/00*

U.S. Cl. 455—614 **1 Claim**



1. In an optical telephone wherein amplitude modulated light is converted to sound by applying the modulated light to the light entering side of an enclosed volume of special gas contained in a gas absorption cell containing a matrix of carbonized cotton fibers suspended in air and wherein the volume of gas varies in synchronism with the instantaneous energy of the modulated light and wherein an optical fiber is used as the transmission element of the modulated light to the light entering side of the gas absorption cell, the improvement of covering the light entering side of the gas absorption cell with a positive lens and positioning the optical fiber at the focal point of the lens to more uniformly distribute the modulated light in the light entering side of the gas cell causing an improved and more efficient conversion of the modulated light directly into sound.

DESIGNS

MAY 20, 1986

283,844

MONEY CLIP

Michael H. Saad, Bldg. 105, Industrial Park, Spokane, Wash. 99216; Herbert Wunder, W. 2505 Waikiki, Spokane, Wash. 99218, and William M. Saad, Rte. 6, Box 158, Spokane, Wash. 99207

Filed Mar. 28, 1983, Ser. No. 479,442

Term of patent 14 years

U.S. Cl. D2—430

283,845

INFLATABLE INSULATED CARRYING CONTAINER

Joseph R. Lief, Lewisville, and Michael D. McCully, Dallas, both of Tex., assignors to M. Dale Smith, Dallas, Tex.

Filed Feb. 15, 1984, Ser. No. 580,256

Term of patent 14 years

U.S. Cl. D3—30.1

283,846

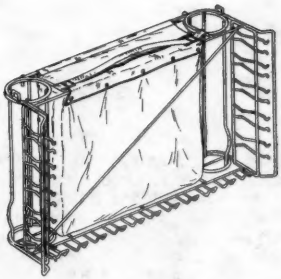
SOFTBALL EQUIPMENT CADDY OR SIMILAR ARTICLE

Elmer A. Wessel, Lincoln, Nebr., assignor to Industrial Machine Specialties, Inc., Lincoln, Nebr.

Filed Dec. 1, 1983, Ser. No. 557,051

Term of patent 14 years

U.S. Cl. D3—36



283,847

FOOT SCRUBBER

Griffith C. Miller, Norman, Okla., assignor to Dr. Miller's Health Care Products, Inc., Norman, Okla.

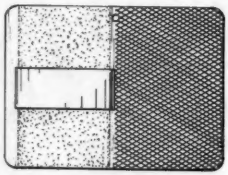
Filed Jan. 9, 1984, Ser. No. 569,340

Term of patent 14 years

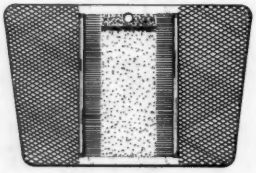
U.S. Cl. D4—120

283,848
FOOT HYGIENE BRUSH HAVING A VERTICALLY DISPOSED DIGITAL BRUSH
Griffith C. Miller, Norman, Okla., assignor to Dr. Miller's Health Care Products, Inc., Norman, Okla.
Filed Jan. 10, 1984, Ser. No. 569,729
Term of patent 14 years
U.S. Cl. D4—120

283,849
FOOT HYGIENE DEVICE HAVING A CENTRALLY DISPOSED DORSAL BRUSH
Griffith C. Miller, Norman, Okla., assignor to Dr. Miller's Health Care Products, Inc., Norman, Okla.
Filed Jan. 9, 1984, Ser. No. 569,341
Term of patent 14 years
U.S. Cl. D4—120



283,850
BRUSH FOR CLEANING THE VENTRAL AND LATERAL SURFACES OF A FOOT
Griffith C. Miller, 4340 Hillside Dr., Norman, Okla. 73069
Filed Jan. 9, 1984, Ser. No. 569,479
Term of patent 14 years
U.S. Cl. D4—120

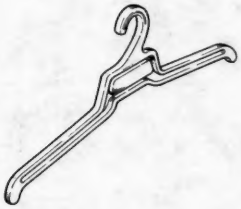


283,851
POOL TABLE BRUSH
Stephen J. Walko, Englewood, Colo., assignor to Crystal Leisure, Inc., Englewood, Colo.
Filed Jun. 18, 1984, Ser. No. 621,854
Term of patent 14 years
U.S. Cl. D4—130

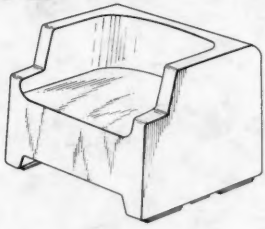
283,852
HAIRBRUSH
Jason C. Hsu, 4th Floor, No. 16, Min Tsu East Rd., Taipei, Taiwan
Filed Feb. 7, 1984, Ser. No. 578,368
Term of patent 14 years
U.S. Cl. D4—136

283,853
LIGHTED MIRROR
John Wistrand, New Canaan, Conn., assignor to Clairol Incorporated, New York, N.Y.
Filed Oct. 5, 1983, Ser. No. 539,039
Term of patent 14 years
U.S. Cl. D6—308

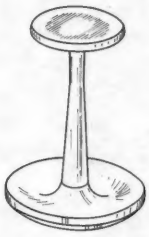
283,854
GARMENT HANGER
David J. Marshall, East Doncaster, Australia, assignor to Spotless Plastics Pty. Ltd., Victoria, Australia
Filed Nov. 21, 1984, Ser. No. 673,569
Claims priority, application Australia, May 22, 1984, 7575/84
Term of patent 14 years
U.S. Cl. D6—318



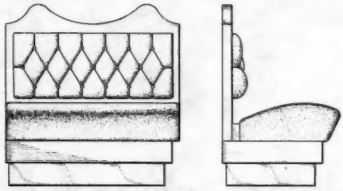
283,855
BOOSTER SEAT
Stanley M. Kujawski, East Aurora, N.Y., assignor to The Quaker Oats Company, Chicago, Ill.
Filed Feb. 2, 1984, Ser. No. 576,265
Term of patent 14 years
U.S. Cl. D6—333



283,856
TILTABLE STOOL
Jonathan Elmaleh, 4 Second St., Brooklyn, N.Y. 11231
Filed Nov. 8, 1983, Ser. No. 550,018
Term of patent 14 years
U.S. Cl. D6—349



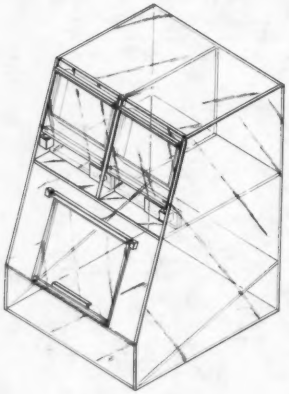
283,857
RESTAURANT BOOTH SEAT
Christos Livieratos, Chicago, Ill., assignor to Chicago Booth Mfg., Co., Inc., Chicago, Ill.
Filed Dec. 12, 1983, Ser. No. 560,862
Term of patent 14 years
U.S. Cl. D6—364



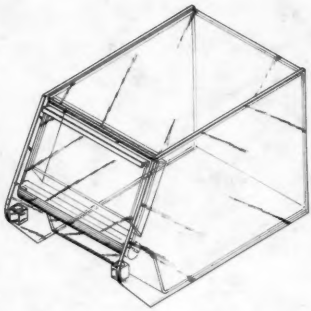
283,858
CHAIR
Peter Opsvik, Högtunveien 12, 1370 Asker, Norway
Filed Sep. 13, 1983, Ser. No. 531,869
Claims priority, application Norway, Mar. 17, 1983, 63854; Mar. 17, 1983, 63855
Term of patent 14 years
U.S. Cl. D6—366

283,859
WINE BOTTLE DISPLAY RACK
La Verne Padgett, 1233 Candlewood Dr., Fullerton, Calif. 92633
Filed Jul. 5, 1983, Ser. No. 510,724
Term of patent 14 years
U.S. Cl. D6—463

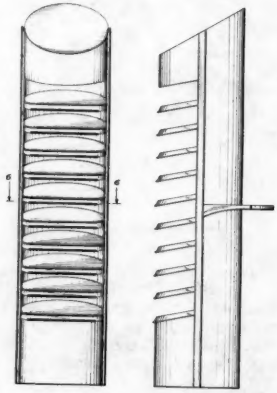
283,860
STACKABLE THREE COMPARTMENT BULK FOOD DISPLAY MODULE
Richard Cantolino, Atlantic Highlands, N.J., assignor to Mayfair Super Markets, Inc., Elizabeth, N.J.
Filed Oct. 28, 1983, Ser. No. 546,765
Term of patent 14 years
U.S. Cl. D6—471

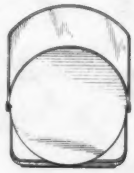


283,861
STACKABLE BULK FOOD DISPLAY MODULE
Richard Cantolino, Atlantic Highlands, N.J., assignor to Mayfair Super Markets, Inc., Elizabeth, N.J.
Filed Oct. 28, 1983, Ser. No. 546,628
Term of patent 14 years
U.S. Cl. D6—471

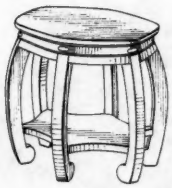


283,862
DISPLAY STAND OR SIMILAR ARTICLE
Sydney Edson, East Meadow; Salvatore Miuccio, Larchmont, and Howard Nathan, New York, all of N.Y., assignors to The Howard Marlboro Group, Inc., New York, N.Y.
Filed Jan. 13, 1984, Ser. No. 570,483
Term of patent 14 years
U.S. Cl. D6—473



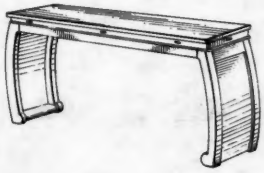


283,863
TABLE
Christopher S. Bergelin, Morganton, N.C., assignor to Gordon's Inc., Johnson City, Tenn.
Filed Sep. 20, 1985, Ser. No. 778,136
Term of patent 14 years
U.S. Cl. D6—477



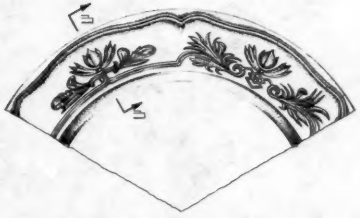
283,864
TABLE
Christopher S. Bergelin, Morganton, N.C., assignor to Gordon's Inc., Johnson City, Tenn.
Filed Sep. 20, 1985, Ser. No. 778,137
Term of patent 14 years
U.S. Cl. D6—484

283,865
TABLE
Christopher S. Bergelin, Morganton, N.C., assignor to Gordon's Inc., Johnson City, Tenn.
Filed Sep. 20, 1985, Ser. No. 778,139
Term of patent 14 years
U.S. Cl. D6—484

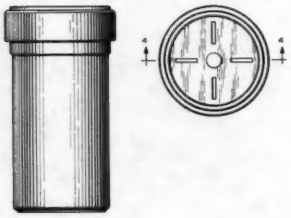


283,866
DRINKING VESSEL
William P. Campbell, 2103 Bayside Dr., Corona del Mar, Calif. 92625
Filed Mar. 21, 1983, Ser. No. 477,316
Term of patent 14 years
U.S. Cl. D7—13

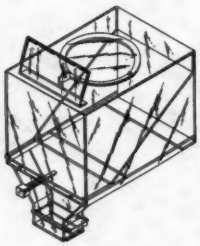
283,867
DINNER PLATE OR THE LIKE
Bernard Scherer, Luxembourg, Luxembourg, assignor to Villeroy & Boch S.a.r.l., Luxembourg
Filed Dec. 30, 1982, Ser. No. 454,609
Claims priority, application Benelux, Jun. 30, 1982, 09926-06
Term of patent 14 years
U.S. Cl. D7—36



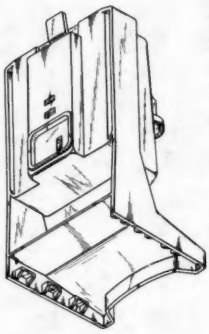
283,868
KNIFE HOLDER
Roger L. Kelly, Palatine, Ill., assignor to Ekco Housewares, Inc., Franklin Park, Ill.
Filed Feb. 6, 1984, Ser. No. 577,582
Term of patent 14 years
U.S. Cl. D7—74

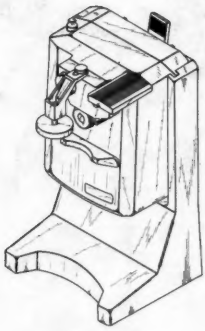


283,869
BULK FOOD DISPENSER
James S. Blahowicz, 56 Crownland Circle Rd., West Seneca, N.Y. 14224
Filed Mar. 30, 1983, Ser. No. 480,218
Term of patent 14 years
U.S. Cl. D7—76



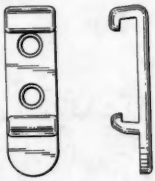
283,870
ELECTRIC CAN OPENER
Osamu Yamamoto, Nagoya, and Senichiro Norizuki, Aichi, both of Japan, assignors to Kabushikikaisha Aichidenkikosakusho, Japan
Filed Sep. 27, 1983, Ser. No. 536,422
Term of patent 14 years
U.S. Cl. D8—36





283,871
WIRE STRIPPER
Zdzislaw Bieganski, 'Brushwood' Kinsbourne Green, Harpenden, Hertfordshire, England
Filed Jan. 27, 1983, Ser. No. 546,037
Claims priority, application United Kingdom, Sep. 8, 1983, 1015017
Term of patent 14 years
U.S. Cl. D8—98

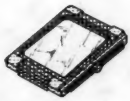
283,872
RETAINING CLIP
Charles D. Clendinen, Mount Clemens, Mich., assignor to Burton, Parker & Schramm, P.C., Mt. Clemens, Mich.
Filed Apr. 11, 1983, Ser. No. 483,670
Term of patent 14 years
U.S. Cl. D8—394



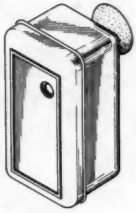
283,873
COMBINED PACKAGING CONTAINER AND ATTACHED SPOON
Rolf M. Dilot, Uppåkra, Sweden, assignor to Tetra Pak International AB, Lund, Sweden
Filed Nov. 30, 1983, Ser. No. 556,569
Claims priority, application Sweden, Jun. 27, 1983, 831732
Term of patent 14 years
U.S. Cl. D9—337

283,874
CLOCK WITH GOLF CLUB
Marcel Fontannaz, Echandens, Switzerland
Filed Jan. 30, 1984, Ser. No. 574,750
Claims priority, application Hague, Aug. 22, 1983, DM/002-808
Term of patent 14 years
U.S. Cl. D10—6

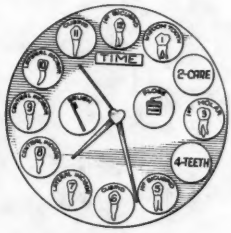
283,875
WATCHCASE
Jean G. Malamoud, Saint-Jorioz, France, assignor to S. T. DuPont, Paris, France
Filed Aug. 4, 1983, Ser. No. 520,105
Claims priority, application France, Feb. 8, 1983, 830 418
Term of patent 14 years
U.S. Cl. D10—38



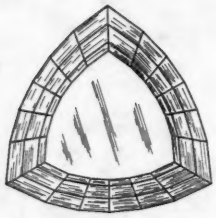
283,876
LIQUID LEVEL ALARM
Julius I. Tabach, 10102 Empyrean, #201, Century City, Calif. 90067
Filed May 30, 1984, Ser. No. 615,354
Term of patent 14 years
U.S. Cl. D10—106

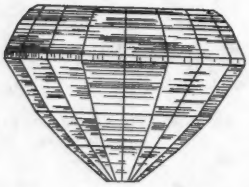


283,877
COMBINED CLOCK DIAL AND HANDS
Lucille Faciane, P.O. Box 3703, Inglewood, Calif. 90301
Filed Jan. 24, 1984, Ser. No. 573,427
Term of patent 14 years
U.S. Cl. D10—126

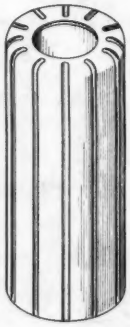


283,878
PRECIOUS, SEMIPRECIOUS OR SYNTHETIC CUT STONE
Robert L. Henrickson, 1323 Granite Ave., Billings, Mont. 59102
Filed Jun. 13, 1983, Ser. No. 481,313
Term of patent 14 years
U.S. Cl. D11—90

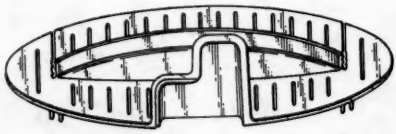




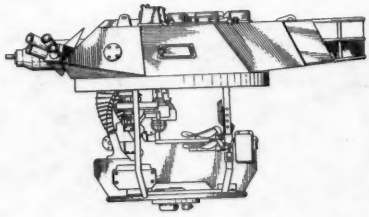
283,879
BUD VASE
Vanda J. Bussell, 283 Nottingham Rd., Ramsey, N.J. 07446
Filed Jun. 28, 1984, Ser. No. 625,734
Term of patent 14 years
U.S. Cl. D11—152

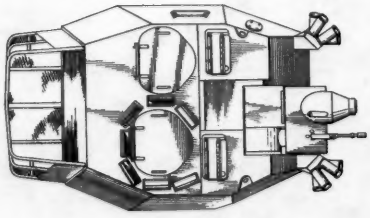


283,880
PLATE TO SUPPORT SOIL ABOVE A WATER RESERVOIR IN A PLANTER
Arthur R. Carlson, East Malvern, Australia, assignor to The Decor Corporation Pty., Ltd., Scoresby, Australia
Filed Mar. 4, 1983, Ser. No. 472,150
Term of patent 14 years
U.S. Cl. D11—164

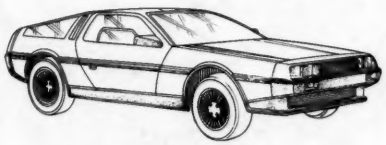


283,881
COMBINED ARMORED VEHICLE TURRET AND CONTROL PIT
Richard S. LeBlanc, Mt. Clemens, Mich., assignor to General Motors Corporation, Detroit, Mich.
Continuation of Ser. No. 436,409, Oct. 25, 1982, abandoned. This application Dec. 13, 1984, Ser. No. 681,296
Term of patent 14 years
U.S. Cl. D12—12

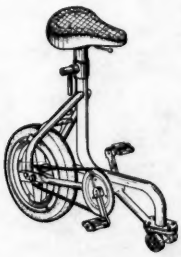




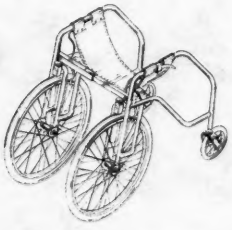
283,882
AUTOMOBILE
Giorgetto Giugiaro, Turin, Italy, assignor to Delorean Motor Company
Filed Jun. 12, 1981, Ser. No. 273,091
Term of patent 14 years
U.S. Cl. D12—91



283,883
VELOCIPEDE
Henry T. H. Chen, 375 An-Pin Rd., Tainan; William W. L. Chuang, 2nd Fl., No. 35, 244 Alley, Dun-Hwa N. Rd., and Tsai-Kuan Lin, 6th Fl., 157-1, Yien-Chi St., both of Taipei, all of Taiwan
Filed Jun. 28, 1982, Ser. No. 392,627
Term of patent 14 years
U.S. Cl. D12—107

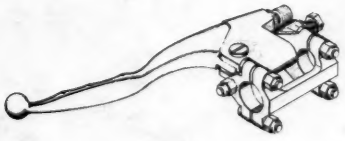


283,884
WHEELED WALKER
Ronald Erfurth, 880 N. Main St., Oregon, Wis. 53575
Filed Dec. 15, 1983, Ser. No. 561,957
Term of patent 14 years
U.S. Cl. D12—130



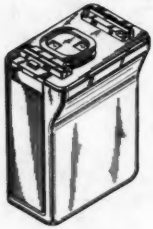
283,885
TIRE FOR AIRPLANES
Sang Ho Kim, 298-1, Sangmo-dong, Kumi-shi, Kyongsang Buk-Do, Rep. of Korea
Filed Mar. 23, 1984, Ser. No. 592,880
Term of patent 14 years
U.S. Cl. D12—145

283,886
PIVOTALLY MOUNTED MOTORCYCLE HAND LEVER
Christopher S. Trapp, 1706-A Kent St., Roseville, Calif. 95678
Filed Apr. 16, 1984, Ser. No. 600,713
Term of patent 14 years
U.S. Cl. D12—179



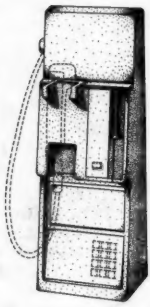
283,887
AUTOMOBILE SPOILER
Adolf Koch, Waiblingen-Neustadt, Fed. Rep. of Germany, assignor to ATG Autotelle-Grosshandel GmbH, Waiblingen, Fed. Rep. of Germany
Filed Jun. 1, 1983, Ser. No. 499,909
Claims priority, application Fed. Rep. of Germany, Dec. 16, 1982, 920
Term of patent 14 years
U.S. Cl. D12—181

283,888
BATTERY OR SIMILAR ARTICLE
Bruce A. Claxton, Coral Springs, Fla., and Richard K. Althans, Long Groove, Ill., assignors to Motorola, Inc., Schaumburg, Ill.
Filed Mar. 4, 1983, Ser. No. 472,420
Term of patent 14 years
U.S. Cl. D13—8

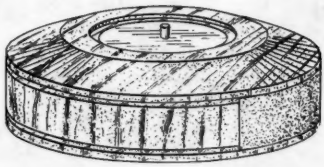


283,889
CORDLESS TELEPHONE, OR THE LIKE
Jay Steinbeck, 16475 Mulholland Dr., Los Angeles, Calif. 90049
Filed Sep. 8, 1983, Ser. No. 530,764
Term of patent 14 years
U.S. Cl. D14—53

283,890
CALLING CARD TELEPHONE
David M. Britz, Rumson; Donald M. Genaro, Haworth, both of N.J.; John N. McGarvey, Drexel, Pa., and Michael P. Zambelli, Maplewood, N.J., assignors to AT&T Technologies, Inc., Berkeley Heights, N.J.
Filed Apr. 29, 1985, Ser. No. 728,380
Term of patent 14 years
U.S. Cl. D14—55



283,891
TELECONFERENCING MICROPHONE
David Parshad, Ottawa, and Radamis Botros, Nepean, both of Canada, assignors to Darome, Inc., Harvard, Ill.
Filed Dec. 8, 1983, Ser. No. 559,363
Term of patent 14 years
U.S. Cl. D14—59



283,892

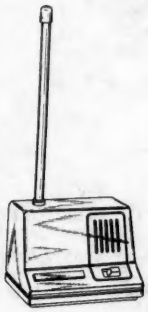
MONITOR TRANSMITTER

Gordon L. Cutler, Miamisburg, Ohio, assignor to The Quaker Oats Company, Chicago, Ill.

Filed Feb. 7, 1984, Ser. No. 577,964

Term of patent 14 years

U.S. Cl. D14—68



283,893

FLOPPY DISC

Kazumi Fujimoto, Tokyo, Japan, assignor to Sony Corporation, Tokyo, Japan

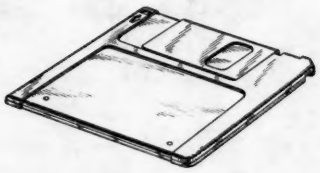
Filed Mar. 29, 1983, Ser. No. 480,149

Claims priority, application Japan, Dec. 7, 1982, 57-54962

The portion of the term of this patent subsequent to Nov. 8, 1997, has been disclaimed.

Term of patent 14 years

U.S. Cl. D14—114



283,894

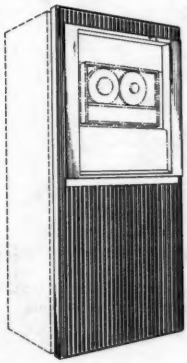
DOOR FOR A DATA PROCESSOR CABINET OR THE LIKE

Mark S. Gubser, Thornton; John R. Janczy, Boulder; Robert G. Mohr, Broomfield, and William F. Prohaska, Northglenn, all of Colo., assignors to AT&T Information Systems Inc., Holmdel, N.J.

Filed Jul. 6, 1984, Ser. No. 628,598

Term of patent 14 years

U.S. Cl. D14—114



283,895

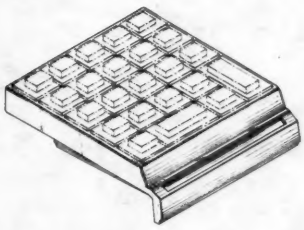
ROM CARTRIDGE KEYPAD FOR PERSONAL COMPUTER

Gary E. Grimes, Watertown, Conn., assignor to Timex Computer Corporation, Waterbury, Conn.

Filed Jan. 5, 1984, Ser. No. 568,322

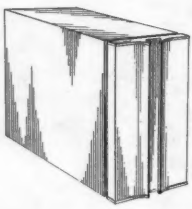
Term of patent 14 years

U.S. Cl. D14—114



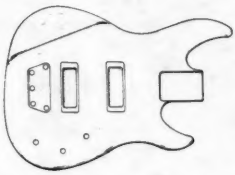
283,896
ALTERNATOR STAND
Douglas B. Evans, 7045 Lasaine Ave., Van Nuys, Calif. 91406, and Robert G. Symonds, 6004 Cheseboro Rd., Agoura, Calif. 91301
Filed Jul. 25, 1983, Ser. No. 517,245
Term of patent 14 years
U.S. Cl. D15—5

283,897
REFRIGERATOR
Raymond Mitchell, 6224 St-Denis, Montreal, Quebec, Canada (H2S 2R7)
Filed Aug. 12, 1983, Ser. No. 522,656
Term of patent 14 years
U.S. Cl. D15—79

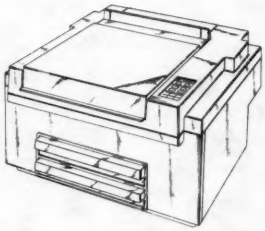


283,898
HOUSING FOR A FLASH DEVICE
Richard N. Buteau, 538 Todd Loop, White Rock, N. Mex. 87544
Filed Aug. 30, 1982, Ser. No. 412,391
Term of patent 14 years
U.S. Cl. D16—42

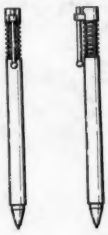
283,899
GUITAR BODY OR SIMILAR ARTICLE
Hartley D. Peavey, Meridian, Miss., assignor to Peavey Electronics Corporation, Meridian, Miss.
Filed Oct. 7, 1983, Ser. No. 539,988
Term of patent 14 years
U.S. Cl. D17—20



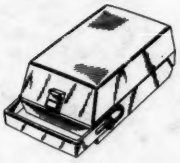
283,900
INTEGRATED FEEDER PRINTER
Richard Hollerith, Jr., Montville, and Helmut A. Schneider, Clifton, both of N.J., assignors to Ziyad, Inc., Denville, N.J.
Filed Apr. 5, 1984, Ser. No. 596,921
Term of patent 14 years
U.S. Cl. D18—13



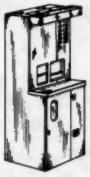
283,901
WRITING INSTRUMENT
Günter Horntrich, Pforzheim-Brötzingen, Fed. Rep. of Germany, assignor to Kreuzer Produktion and Vertrieb GmbH, Fed. Rep. of Germany
Filed Apr. 27, 1984, Ser. No. 604,866
Claims priority, application Fed. Rep. of Germany, Oct. 31, 1983, 20 MR 1976
Term of patent 14 years
U.S. Cl. D19—50



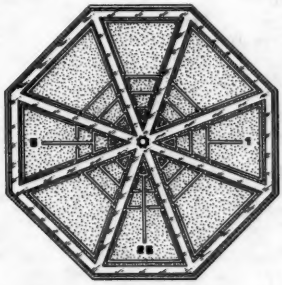
283,902
CLOSED PORTABLE CARD FILE
Albrecht Goertz, New York, N.Y., assignor to Rolodex Corporation, Secaucus, N.J.
Filed Nov. 10, 1983, Ser. No. 550,962
Term of patent 14 years
U.S. Cl. D19—76



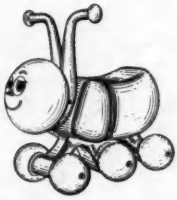
283,903
VENDING CABINET
Henry J. Albright, West Des Moines, Iowa, assignor to Fawn Engineering Corporation, Des Moines, Iowa
Filed Jun. 13, 1983, Ser. No. 503,498
Term of patent 14 years
U.S. Cl. D20—4



283,904
GAME PLAYING SURFACE PANEL FOR AN ELECTRONIC GAME HOUSING
Carl A. Blood, 13217 James Ave. S., Burnsville, Minn. 55337
Filed Jun. 20, 1983, Ser. No. 506,198
Term of patent 14 years
U.S. Cl. D21—13

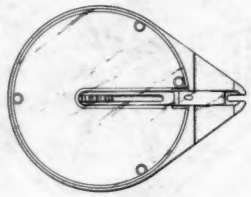


283,905
RIDING TOY
Earl B. Kane, 58 Aiken St., Norwalk, Conn. 06851, and George Sivy, 2 Highcliffe Ter., Ridgefield, Conn. 06877
Filed Jan. 27, 1984, Ser. No. 574,780
Term of patent 14 years
U.S. Cl. D21—74



283,906
TOY SAILOR FIGURE
Jacob Nielsen, Copenhagen, Denmark, assignor to Interlego AG, Baar, Switzerland
Filed Dec. 15, 1983, Ser. No. 561,744
Term of patent 14 years
U.S. Cl. D21—178

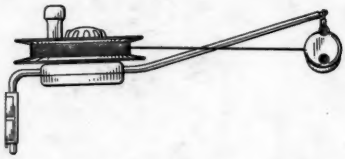
283,907
CIRCULAR SPACER INSERTER FOR STRINGED RACKETS
Gerold Anderka, Holsteiner Chaussee 439, 2087 Ellerbek, and Walter Jozat, An der Hudau 2, 2357 Bad Bramstedt, both of Fed. Rep. of Germany
Filed Jun. 29, 1984, Ser. No. 626,181
Claims priority, application Fed. Rep. of Germany, Feb. 14, 1984, 67 MR 196
Term of patent 14 years
U.S. Cl. D21—212



283,908
WATER SKI HANDLE
Joseph F. Ziomek, West Bloomfield, Mich., assignor to Power Plus Products, Inc., West Bloomfield, Mich.
Filed Sep. 2, 1983, Ser. No. 529,088
Term of patent 14 years
U.S. Cl. D21—230

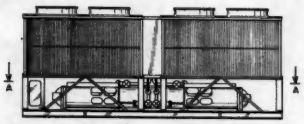
283,909
FISHING ROD HOLDER
Robert J. Hoover, Rte. 7, Box 352A, Spartanburg, S.C. 29303
Filed Aug. 15, 1983, Ser. No. 523,459
Term of patent 14 years
U.S. Cl. D22—13

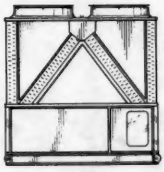
283,910
DOWNRIGGER
Blayney J. Scott, Victoria, Canada, assignor to Scott Plastics Ltd., Victoria, Canada
Filed Oct. 25, 1983, Ser. No. 545,184
Claims priority, application Canada, Sep. 29, 1983, 29-09-83-2
Term of patent 14 years
U.S. Cl. D22—26



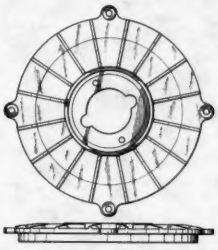
283,911
COOLING TOWER
Akira Miyamoto, and Kazuyuki Yamaguchi, both of Nagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Sep. 2, 1983, Ser. No. 528,757
Claims priority, application Japan, Mar. 15, 1983, 58-11152
Term of patent 14 years
U.S. Cl. D23—139

283,912
COOLING TOWER
Akira Miyamoto, and Kazuyuki Yamaguchi, both of Nagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Sep. 2, 1983, Ser. No. 528,758
Claims priority, application Japan, Mar. 15, 1983, 58-11150
Term of patent 14 years
U.S. Cl. D23—139



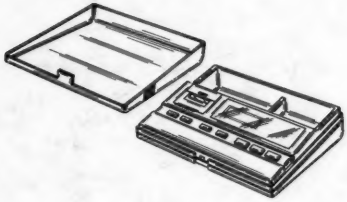


283,913
FAN MOUNT
Robert Tomlinson, 28813 Farmersville Blvd., Farmersville, Calif. 93223
Filed Sep. 6, 1983, Ser. No. 529,228
Term of patent 14 years
U.S. Cl. D23—163

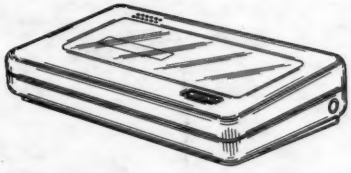


283,914
MOUTHPIECE FOR BREATH TESTING EQUIPMENT
Cecil B. Garner, 4008 Brown Pl., Raleigh, N.C. 27604
Filed Jul. 8, 1983, Ser. No. 511,953
Term of patent 14 years
U.S. Cl. D24—17

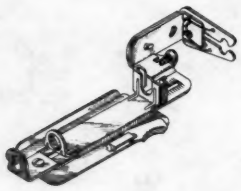
283,915
SPHYGMOMANOMETER
Mikio Kosako; Hiroshi Nishibori; Kazumi Osaka, and Harumi Fukuda, all of Osaka, Japan, assignors to Sharp Corporation, Osaka, Japan
Filed Sep. 5, 1984, Ser. No. 647,939
Claims priority, application Japan, Mar. 8, 1984, 59-9272
Term of patent 14 years
U.S. Cl. D24—21



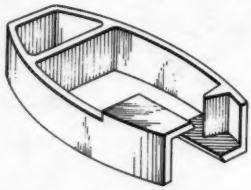
283,916
SPHYGMOMANOMETER
Kunio Akiyama, Osaka, Japan, assignor to Sharp Corporation, Osaka, Japan
Filed Sep. 5, 1984, Ser. No. 647,940
Claims priority, application Japan, Mar. 8, 1984, 59-9274
Term of patent 14 years
U.S. Cl. D24—21



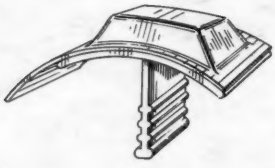
283,917
INSULIN SYRINGE INJECTOR WITH AUTO-ASPIRATOR
Paul C. Moore, Jr., Matoaca, Va., assignor to John A. Long, Petersburg, Va., a part interest
Filed Nov. 7, 1983, Ser. No. 549,968
Term of patent 14 years
U.S. Cl. D24—25



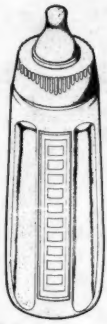
283,918
FLEXIBLE CATHETER TUBE FLUSHING CLAMP
Harold Jacobson, 14 Breton Ave., Melville, N.Y. 11747
Filed Aug. 26, 1983, Ser. No. 526,615
Term of patent 14 years
U.S. Cl. D24—27



283,919
DISPOSABLE SWAB APPLICATOR
Jean M. Mathias, Nivelles, and Jean Kersten, St. Amand, both of Belgium, assignors to Baxter Travenol Laboratories, Inc., Deerfield, Ill.
Filed Dec. 5, 1983, Ser. No. 557,809
Term of patent 14 years
U.S. Cl. D24—34



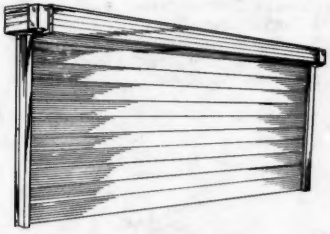
283,920
NURSING BOTTLE
Sam Chen, Taipei, Taiwan, assignor to Gissing Enterprises Inc., Taipei, Taiwan
Filed Jul. 11, 1983, Ser. No. 512,465
Term of patent 14 years
U.S. Cl. D24—47



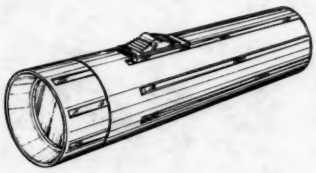
283,921
BLOOD COLLECTOR
Bruce A. Dyak, Livonia, Mich., assignor to Difco Laboratories Incorporated, Detroit, Mich.
Filed Jun. 27, 1983, Ser. No. 508,279
Term of patent 14 years
U.S. Cl. D24—52

283,922
STRAP FOR CLOSING URINE COLLECTION POUCHES
William L. Petersen, Hoffman Estates, Ill., assignor to Hollister Incorporated, Libertyville, Ill.
Filed Nov. 21, 1983, Ser. No. 553,528
Term of patent 14 years
U.S. Cl. D24—54

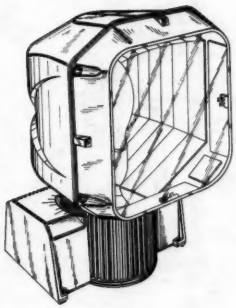
283,923
COMBINED GARAGE DOOR AND OPENER
Susanne G. Henry; Kazuo Tsunemura, both of Chicago, and Kiyoshi Iha, Elk Grove Village, all of Ill., assignors to Chamberlain Manufacturing Corporation, Elmhurst, Ill.
Filed Jul. 28, 1983, Ser. No. 517,900
Term of patent 14 years
U.S. Cl. D25—49



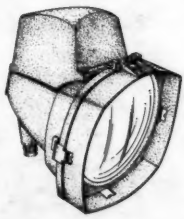
283,924
FLASHLIGHT
Andrew Yau, Hong Kong, Hong Kong, assignor to Practical Products Mfy, Ltd, Hong Kong, Hong Kong
Filed Aug. 15, 1983, Ser. No. 523,077
Claims priority, application United Kingdom, May 19, 1983, 1013146
Term of patent 14 years
U.S. Cl. D26—49



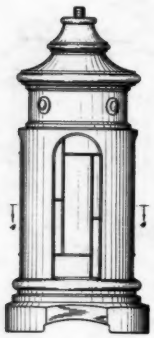
283,925
HIGH INTENSITY DISCHARGE LIGHT FIXTURE
Richard Sangiamo, Roselle, and Thomas Russello, Elizabeth, both of N.J., assignors to Keene Corporation, Union, N.J.
Filed Dec. 27, 1983, Ser. No. 565,832
Term of patent 14 years
U.S. Cl. D26—61



283,926
FLOODLIGHT
Hendrik A. J. de Vos, Swansea, Mass., and William I. Young, Toronto, Canada, assignors to GTE Products Corporation, Stamford, Conn.
Filed Mar. 17, 1983, Ser. No. 476,437
Term of patent 14 years
U.S. Cl. D26—63



283,927
LAMP BASE
Terry Manton, Clifton, N.J., assignor to Westwood Lighting Group, Inc., Paterson, N.J.
Filed Mar. 6, 1984, Ser. No. 586,626
Term of patent 14 years
U.S. Cl. D26—110

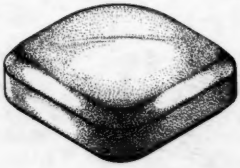


283,928
LAMP BASE
Terry Manton, Clifton, N.J., assignor to Westwood Lighting Group, Inc., Paterson, N.J.
Filed Mar. 6, 1984, Ser. No. 586,627
Term of patent 14 years
U.S. Cl. D26—110

283,929
LAMP BASE
Terry Manton, Clifton, N.J., assignor to Westwood Lighting Group, Inc., Paterson, N.J.
Filed Mar. 6, 1984, Ser. No. 586,628
Term of patent 14 years
U.S. Cl. D26—110

283,930
CIGARETTE HOLDER FOR VEHICLES
Yoshihisa Tanaka, Ichikawa, Japan, assignor to Tanaka Mfg. Co. Ltd., Tokyo, Japan
Filed Nov. 8, 1983, Ser. No. 550,016
Term of patent 14 years
U.S. Cl. D27—48

283,931
PHARMACEUTICAL TABLET
Ronald L. Baum, Philadelphia, Pa., assignor to SmithKline Beckman Corporation, Philadelphia, Pa.
Filed Aug. 1, 1984, Ser. No. 636,193
Term of patent 14 years
U.S. Cl. D28—2



283,932

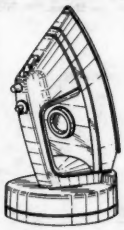
COMBINED IRON AND BASE THEREFOR

William C. Dobson, West Bend, Wis., and William C. Cesaroni, Glenview, Ill., assignors to Dart Industries Inc., Northbrook, Ill.

Filed Feb. 17, 1984, Ser. No. 581,492

Term of patent 14 years

U.S. Cl. D32—68



283,933

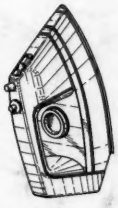
IRON

William C. Dobson, West Bend, Wis., and William C. Cesaroni, Glenview, Ill., assignors to Dart Industries Inc., Northbrook, Ill.

Filed Feb. 17, 1984, Ser. No. 581,494

Term of patent 14 years

U.S. Cl. D32—68



283,934

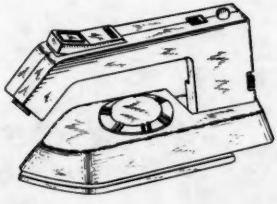
TRAVEL IRON

Masao Tsuji, Old Lyme, Conn., assignor to North American Philips Corporation, New York, N.Y.

Filed Oct. 22, 1984, Ser. No. 663,604

Term of patent 14 years

U.S. Cl. D32—69



283,935

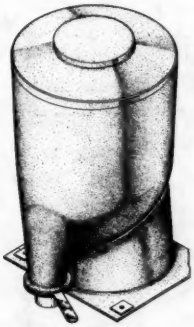
DISPENSING BIN

Scott R. Culshaw, 9538 Knight La., Stockton, Calif. 95209

Filed Apr. 18, 1983, Ser. No. 486,034

Term of patent 14 years

U.S. Cl. D34—39



283,936

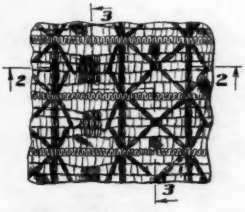
FABRIC

Louis Hornick, II, and Morton Hornick, both of New York, N.Y., assignors to Louis Hornick & Co., New York, N.Y.

Filed Jul. 18, 1983, Ser. No. 493,417

Term of patent 14 years

U.S. Cl. D47—6 R

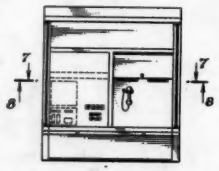


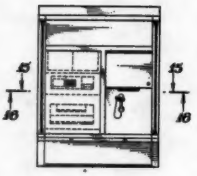
283,937

AUTOMATED TELLER SERVICE CENTER ENCLOSURE

Ernest F. J. Prinzhorn, Los Angeles, Calif., assignor to ORS Corporation, Los Angeles, Calif.

Filed Dec. 1, 1983, Ser. No. 556,856
Term of patent 14 years
U.S. Cl. D99—28



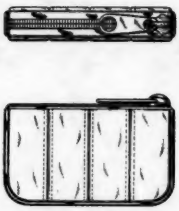


283,938

COIN HOLDER

Murray Strongwater, 326 Hewlett Neck Rd., Woodmere, N.Y. 11598

Filed Aug. 25, 1983, Ser. No. 526,477
Term of patent 14 years
U.S. Cl. D99—34

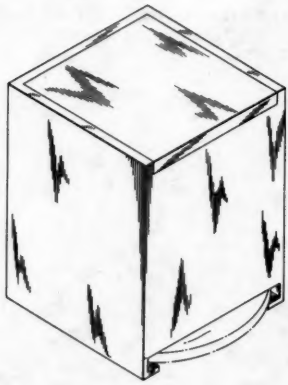


283,939

DASHBOARD MOUNTED TOKEN DISPENSER OR THE LIKE

Michael Saliba, 116 Fairhaven Blvd., Woodbury, N.Y. 11797

Filed Jul. 21, 1982, Ser. No. 400,496
Term of patent 14 years
U.S. Cl. D99—34



LIST OF PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 20TH DAY OF MAY, 1986

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

AB Holmstrands Platindustri: *See*—
Holmstrand, Rune H., 4,589,926, Cl. 134-6.000.

AB Volvo Penta: *See*—
Soderbaum, Ulf, 4,589,850, Cl. 440-61.000.

AB Zander & Ingestrom: *See*—
Mansson, Rune, 4,589,481, Cl. 165-172.000.

Abbott, Ralph E.; and Massa, Ronald J. Stairwell security system. 4,590,460, Cl. 340-541.000.

Abe, Hiroshi, to Asahi Seiko Kabushiki Kaisha. Coin dispensing apparatus. 4,589,433, Cl. 133-5.00R.

Abe, Mitsuo: *See*—
Yonemura, Shigehiro; Umino, Hiroshi; Kume, Masao; Abe, Mitsuo; and Miyatake, Satoshi, 4,589,230, Cl. 51-95.0GH.

Abe, Nobuo: *See*—
Hori, Yasuro; and Abe, Nobuo, 4,590,491, Cl. 346-76.0PH.

Abe, Yasuaki: *See*—
Asano, Kajio; Sato, Toshihiko; Oda, Haruo; Abe, Yasuaki; and Watanabe, Yoshitaka, 4,589,184, Cl. 29-430.000.

Abendroth, Carl W. Flooring system with strip of resilient material in compression. 4,589,243, Cl. 52-403.000.

Abo, Keiju; Kumura, Haruyoshi; Hirano, Hiroyuki; Tanaka, Yoshikazu; Yamamuro, Sigeaki; and Morimoto, Yoshiro, to Nissan Motor Co., Ltd. Method and apparatus for controlling reduction ratio of continuously variable transmission with accelerator pedal displacement speed compensation. 4,590,561, Cl. 364-424.100.

Abraham, Nicholas F., to World Video Library, Inc. Recorded program communication system. 4,590,516, Cl. 358-86.000.

Achelpohl, Fritz, to Windmoller & Holscher. Method and apparatus for undoing the interconnection between stamped stacks of bags. 4,589,183, Cl. 29-426.500.

Ackley, John N.: *See*—
Rogoff, Mortimer; Winkler, Peter M.; and Ackley, John N., 4,590,569, Cl. 364-452.000.

Adams Hard-Facing Company, Inc.: *See*—
Wetmore, Halsey J., 4,589,498, Cl. 172-719.000.

Adams, Isabelle M.; Carlson, James M.; Rooks, James B.; and Yeshaya, Amalia, to Spacelabs Inc. Method and apparatus for ECG rhythm analysis. 4,589,420, Cl. 128-702.000.

Adams, Terry N.; Spurrell, Robert M.; Karsner, Grant G.; Golike, Gregory P.; and Lincoln, James F. L., to Weyerhaeuser Company. Energy recovery from biomass using fuel having a bimodal size distribution. 4,589,356, Cl. 110-347.000.

Adinolfi, Philip J.; and Redpath, Arthur B., to Westinghouse Electric Corp. Automated component handling system. 4,589,817, Cl. 414-729.000.

Adria Laboratories, Inc.: *See*—
Carter, John P., Jr.; and Wolgemuth, Richard L., 4,590,063, Cl. 424-19.000.

Advanced Combustion Inc.: *See*—
Loukas, Paul W.; Braune, Rudolf E.; and Fischer, Ekkehard, 4,589,844, Cl. 432-223.000.

Advanced Micro Devices, Inc.: *See*—
Rallapalli, Krishna; and Kaku, Shinkyo, 4,590,521, Cl. 358-261.000.

Agee, Russell D.: *See*—
Renegar, Charles G.; and Agee, Russell D., 4,589,367, Cl. 118-66.000.

Agfa-Gevaert Aktiengesellschaft: *See*—
Fursich, Manfred; Findeis, Gunter; Treiber, Helmut; Fergg, Berthold; and Thurm, Siegfried, 4,589,766, Cl. 355-38.000.
Klotzer, Sieghart, 4,590,155, Cl. 430-567.000.

Agfa-Gevaert N.V.: *See*—
De Schamphelaere, Lucien A.; Librecht, Freddy M.; and Verlinden, Willy G., 4,589,762, Cl. 355-14.00D.

Ahne, Hellmut; Kleeberg, Wolfgang; Rubner, Roland; and Kruger, Hans, to Siemens Aktiengesellschaft. Method for the preparation of thin polyimide film. 4,590,103, Cl. 427-387.000.

Aichi Electric Works Co., Ltd.: *See*—
Yoshida, Katsuhiro; and Horiguchi, Hiroshi, 4,590,387, Cl. 307-64.000.

Air Products and Chemicals, Inc.: *See*—
Chen, Michael S. K.; Goff, Stephen P.; and VanOmmeren, James, 4,589,896, Cl. 62-28.000.
Goodell, Paul D.; Huston, Ernest L.; Rudman, Peter S.; and Sandrock, Gary D., 4,589,919, Cl. 75-251.000.
Rosamilia, Peter L.; and Davidowich, George, 4,590,102, Cl. 427-374.100.

Airpot Corporation: *See*—
Leonard, George H., 4,589,164, Cl. 16-299.000.

Ajinomoto Company, Incorporated: *See*—
Sakakibara, Shumpei; Yugari, Yasumi; and Hashimoto, Shigebumi, 4,590,178, Cl. 514-18.000.

Akae, Yoshifumi: *See*—
Hamano, Isao; Morishita, Akira; Akae, Yoshifumi; Tanaka, Toshinori; Matsumoto, Kouichi; Gotou, Takeo; and Yabunaka, Kiyoshi, 4,590,385, Cl. 290-38.00E.

Akahori, Kenichi: *See*—
Tadokoro, Hiroyuki; and Akahori, Kenichi, 4,589,764, Cl. 355-14.00R.

Akamatsu, Yoshihiro; Azuma, Tadashi; and Ishida, Toshio, to Fujimori Kogyo Co., Ltd. Tubes for integrated circuits. 4,590,534, Cl. 361-212.000.

Akiba, Masashi; Minagawa, Ryuji; and Mori, Sumio, to Tokyo Shibaura Denki Kabushiki Kaisha. Steam turbine plant. 4,589,256, Cl. 60-660.000.

Akiyoshi, Yutaka; Kobayashi, Shinzo; Kakimi, Fujio; and Matsukawa, Hiroharu, to Fuji Photo Film Co., Ltd. Process for preparing microcapsule reagents for immunological response. 4,590,170, Cl. 436-533.000.

Albee, William H. Off road vehicles. 4,589,460, Cl. 152-170.000.

Albert, Gert; Kamps, Manfred; Noweck, Klaus; Reichenauer, Ansgar; Scherf, Erich; and Ziegler, Udo, to Condea Chemie GmbH. Process and apparatus for producing aluminium alkoxides. 4,590,289, Cl. 556-188.000.

Albertson, Robert V. Vapor introduction system for internal combustion engine. 4,589,376, Cl. 123-25.00L.

Alcan International Limited: *See*—
Bamji, Pervez J. F.; Evans, John F.; and Fitzpatrick, Nigel P., 4,589,637, Cl. 266-234.000.

Aldrich, Donald C. Water shutoff valve. 4,589,435, Cl. 137-102.000.

Aldrich, Joe L., to Keystone International, Inc. Material level detector and control. 4,589,281, Cl. 73-290.00R.

Alexander, Peter W.; and Haddad, Paul R., to Unisearch Limited. Method of potentiometric detection of copper-complexing agents. 4,589,958, Cl. 204-1.00T.

Alfa-Laval AB: *See*—
Dahlgren, Arthur J., 4,589,480, Cl. 165-146.000.
Gullers, Per, 4,589,865, Cl. 494-26.000.

Alig, Roger C., to RCA Corporation. Color picture tube having an improved expanded focus lens type inline electron gun. 4,590,402, Cl. 313-414.000.

Alig, Roger C., to RCA Corporation. Color picture tube having an improved inline electron gun. 4,590,403, Cl. 313-414.000.

Alker, David; Cross, Peter E.; and Campbell, Simon F., to Pfizer Inc. 4-aryl-3,5-bis(alkoxycarbonyl)-6-methyl-2-aminoalkyloxymethyl-1,4-dihydropyridine antihypertensive agents. 4,590,195, Cl. 514-252.000.

Allen, Billy R.; Huffman, William J.; and Nack, Herman, to Battelle Development Corporation. Liquid multisolid fluidized bed processing. 4,589,927, Cl. 134-25.100.

Allen, Dell K., to Brigham Young University. Polar coordinate apparatus. 4,589,174, Cl. 29-33.00R.

Allen, Gordon L. Pipe repair bypass apparatus. 4,589,446, Cl. 138-97.000.

Allen, Linus S.: *See*—
Mills, William R., Jr.; and Allen, Linus S., 4,590,370, Cl. 250-267.000.

Allied Corporation: *See*—
Hall, John L.; Shamine, Dennis R.; and Koenig, James P., 4,589,535, Cl. 192-70.120.

Alopex Industries, Inc.: *See*—
Greskovics, Paul; and Chivens, Donald R., 4,589,986, Cl. 210-483.000.

Alpha Enterprises, Inc.: *See*—
Hehn, Bruce A., 4,589,549, Cl. 206-387.000.

Alps Electric Co., Ltd.: *See*—
Goto, Takashi; and Hirayama, Katsuhiko, 4,590,330, Cl. 178-4.000.
Ijichi, Sadayoshi, 4,590,612, Cl. 455-190.000.

Aluminum Company of America: *See*—
Park, Bom K., 4,589,932, Cl. 148-12.70A.

Alves, Gerald W.: *See*—
Brown, Alfred; Haynes, Stewart; Alves, Gerald W.; and Lim, Frank H., 4,589,486, Cl. 166-252.000.

Amagai, Akikazu: *See*—
Sugio, Akitoshi; Masu, Masanobu; Amagai, Akikazu; and Kobayashi, Toshihiko, 4,590,239, Cl. 525-92.000.

Amana Refrigeration, Inc.: *See*—
Bond, Ralph W.; and Pitz, Harold W., 4,589,709, Cl. 312-257.00A.

Amano, Akira; and Sasaki, Kazuhiko, to Honda Giken Kogyo Kabushiki Kaisha. Grass bag attachment for combination lawn mower and tractor. 4,589,251, Cl. 56-202.000.

Amcodyne Incorporated: *See*—
Laatt, Richard G.; Fiers, Thomas A.; and Andrews, Thomas L., Jr., 4,590,526, Cl. 360-78.000.

American Bank Note Company: *See*—
Kimball, John J.; Kirk, Harry V.; Roule, Richard L.; Sennett, Richard C.; and Sorbo, Peter J., 4,589,943, Cl. 156-256.000.

American Can Company: *See*—
Hsu, Joseph C.; Vought, Donald W.; and Walbrun, George H., 4,590,106, Cl. 428-35.000.

American Cyanamid Company: *See*—
Bright, John H., 4,590,290, Cl. 560-56.000.

American Hospital Supply Corporation: *See*—
Dickens, Duane D., 4,589,287, Cl. 73-727.000.
Mayhan, Kenneth G.; Janssen, Robert A.; and Bertrand, William J., 4,589,964, Cl. 522-85.000.

American Microsystems, Inc.: *See*—
Amir, Gideon, 4,590,457, Cl. 340-347.0DA.
Haque, Yusuf A.; and Takla, Ashraf K., 4,590,440, Cl. 331-17.000.

American Siding Discount Distributor, Inc.: *See*—
Volpenhein, Carl X., 4,589,241, Cl. 52-315.000.

Amir, Gideon, to American Microsystems, Inc. Digital to analog converter utilizing pulse width modulation. 4,590,457, Cl. 340-347.0DA.

Ammon, David. Wrist and forearm exercise apparatus. 4,589,655, Cl. 272-67.000.

Amoco Corporation: *See*—
Satek, Larry C., 4,590,324, Cl. 585-444.000.

Amon, Glen C.: *See*—
Moorehead, Robert M., 4,590,462, Cl. 340-605.000.

AMP Incorporated: *See*—
Burgit, Richard A.; Davis, Newton G.; Goyert, Josita M.; Johnson, Keith, Jr.; Long, Robert A.; and Stachura, Joseph F., 4,589,200, Cl. 29-753.000.
Litehizer, Melvin P., Jr., 4,589,319, Cl. 83-423.000.
Long, Alden O., Jr., 4,589,585, Cl. 228-119.000.
Szczesny, David S., 4,589,718, Cl. 339-95.00D.
Weisenburger, Lawrence P., 4,589,715, Cl. 339-17.00F.

Ampex Corporation: *See*—
Jensen, Peter W.; and Palthe, Richard W., 4,590,510, Cl. 358-19.000.

Analog Devices, Incorporated: *See*—
Burton, David P.; and Real, Peter, 4,590,456, Cl. 340-347.0DA.

Andersen, Arne L., to Flemstofte-Mods Amby Maskinfabriker A/S. Apparatus for treating cellulose-containing matter, e.g. straw, with gaseous ammonia. 4,589,334, Cl. 99-534.000.

Anderson, Dirk N., to Texas Instruments Incorporated. Contacts for VLSI devices using direct-reacted silicide. 4,589,196, Cl. 29-591.000.

Anderson, Paul S. Panel partition arrangement for recreation chamber formation in domestic garages. 4,589,235, Cl. 52-28.000.

Anderson, Thomas T.; Roop, Conard J.; Schmidt, Kenneth J.; and Brewer, John, to United States of America, Energy. Induction voidmeter. 4,590,431, Cl. 324-443.000.

Andersson, Sven: *See*—
Sjostrand, Uno; and Andersson, Sven, 4,589,591, Cl. 229-48.0SA.

Andersson, Thorbjorn, to Tetra Pak International AB. Packing laminate. 4,590,126, Cl. 428-349.000.

Andrew Corporation: *See*—
Dyott, Richard B., 4,589,725, Cl. 350-96.150.
Dyott, Richard B.; Ulrich, Reinhard; and Meyer, John D., 4,589,728, Cl. 350-96.300.

Andrews, Gerald D., to Du Pont de Nemours, E. I., and Company. Light-stable anionically polymerized polymers. 4,590,252, Cl. 526-329.700.

Andrews, Thomas L., Jr.: *See*—
Laatt, Richard G.; Fiers, Thomas A.; and Andrews, Thomas L., Jr., 4,590,526, Cl. 360-78.000.

Anesi, Dennis W.: *See*—
Wilson, Dennis A.; and Anesi, Dennis W., 4,589,514, Cl. 180-289.000.

Angebault, Joel: *See*—
Moessinger, Albert; and Angebault, Joel, 4,589,451, Cl. 139-452.000.

Anheuser-Busch Incorporated: *See*—
Sidoti, Daniel R.; Dokos, John H.; Katz, Edward; and Moscowitz, Charles M., 4,590,085, Cl. 426-582.000.

Ankersmit, Hendrik J.: *See*—
Legrand, Hubrecht L.; and Ankersmit, Hendrik J., 4,589,984, Cl. 210-522.000.

Annoni, Jerry D. Tooth transilluminating light holder. 4,589,846, Cl. 433-30.000.

Ansan Industries Limited: *See*—
Wilson, Dennis A.; and Anesi, Dennis W., 4,589,514, Cl. 180-289.000.

Ansel, Robert E., to DeSoto, Inc. Polyurethane coatings for magnetic recording structures and production thereof. 4,590,250, Cl. 526-301.000.

Anthony, Thomas R., to General Electric Company. Fabrication of drilled and diffused junction field-effect transistors. 4,589,190, Cl. 29-571.000.

Aoishi, Eiji: *See*—
Tsubokura, Yoshihisa; Yamamoto, Sumio; Aoishi, Eiji; and Fujita, Tamio, 4,590,232, Cl. 524-178.000.

Aoki, Harumi: *See*—
Tomori, Yasumasa; Okudaira, Sadao; Aoki, Harumi; Urano, Fumio; and Morisawa, Tahei, 4,589,750, Cl. 354-271.100.

Aoki, Keiji: *See*—
Mitsuyasu, Masaki; Takimoto, Toshiyuki; and Aoki, Keiji, 4,589,279, Cl. 73-118.000.

Aoki, Kenji: *See*—
Shiraishi, Yoshiaki; and Aoki, Kenji, 4,589,732, Cl. 350-331.00R.

Aoki, Mitsuo; Inoue, Satoru; Yamaguchi, Kimitoshi; Uchida, Mitsuru; Tomita, Masami; and Uematsu, Chiaki, to Ricoh Company. Carrier particles for use in a two-component dry-type developer for developing latent electrostatic images. 4,590,141, Cl. 430-108.000.

Aoki, Takashi: *See*—
Nishikawa, Masao; Sakurai, Yoshimi; Aoki, Takashi; and Sato, Yoichi, 4,589,537, Cl. 192-0.052.

Aono, Toshiaki: *See*—
Hirai, Hiroyuki; Yabuki, Yoshiharu; Takeuchi, Masashi; and Aono, Toshiaki, 4,590,154, Cl. 430-559.000.

Apetrei, Constantin; Slaifer, Sigismund; Vatafu-Gaitan, Laurentiu; Stefanescu, Dumitru; Marinescu, Stelian; and Catana, Marin, to Institutal de Cercetare Stintifica si Inginerie Technologica Pentrj Industria Electrotehnica. Electromechanical driving system with variable speed. 4,589,534, Cl. 192-18.00B.

Aqua Control, Inc.: *See*—
Meuleman, Guy A., 4,589,690, Cl. 285-162.000.

Arai, Shoji; and Hasegawa, Masazumi, to Toyo Soda Manufacturing Co., Ltd. Producing polyurethanes using hydroxy-alkyl piperazine catalyst compositions. 4,590,223, Cl. 521-118.000.

Arai, Yoshio; and Mukasa, Kikuei, to Arai, Yoshio. Fluorocarbon resin seal and method of making same. 4,589,665, Cl. 277-1.000.

Araki, Toshimitsu: *See*—
Hotta, Minoru; Hara, Okitada; and Araki, Toshimitsu, 4,589,799, Cl. 405-196.000.

Archer, Lee A.: *See*—
Gentry, John M.; and Archer, Lee A., 4,589,719, Cl. 339-126.00R.

Ardinger, Horace T., Jr.: *See*—
Moorehead, Robert M., 4,590,462, Cl. 340-605.000.

Arens, Erich. Grid construction for runner or doormat. 4,590,110, Cl. 428-53.000.

Ares, Roland A.: *See*—
DiCarlo, Leonard J.; Ares, Roland A.; and Norton, Robert O., 4,589,263, Cl. 62-193.000.

Arikawa, Junichi: *See*—
Kokubo, Eiichi; Goi, Koichi; Arikawa, Junichi; Ebihara, Hideyuki; and Chiba, Hiroshi, 4,589,708, Cl. 312-71.000.

Aristoff, Paul A.; and Sih, John C., to Upjohn Company, The. Novel 9-substituted carbacyclin analogs. 4,590,297, Cl. 568-374.000.

Arkind, Kenneth D.: *See*—
Powers, Richard L.; Arkind, Kenneth D.; and Price, Richmond W., 4,590,478, Cl. 343-700.0MS.

Arlie, Jean: *See*—
Warszawski, Bernard; Fauvel, Pierre; and Arlie, Jean, 4,590,134, Cl. 429-35.000.

Armco Inc.: *See*—
Glodowski, Robert J.; and Van Slyke, Vernon C., 4,589,934, Cl. 148-145.000.

Arnold, Fred E.: *See*—
Wallace, J. Shield; and Arnold, Fred E., 4,590,304, Cl. 568-766.000.

Arnoux, Daniel; Bousquet, Jean; and Genter, Claude, to Chauvin Arnoux. Measuring attachment connectible to a multimeter for measuring earth resistances. 4,590,421, Cl. 324-62.000.

Aronstein, Jesse, to Wright-Malta Corporation. Dynamic display for automatic sound signal analyzer. 4,589,324, Cl. 84-454.000.

Aroskar, Vijay A.: *See*—
Lal, Bansi; Dohadwalla, Alihussein N.; Aroskar, Vijay A.; Dadkar, Nandkumar K.; Dornauer, Horst; Mascarenhas, Julius; and deSouza, Noel J., 4,590,197, Cl. 514-267.000.

Arques, Marc, to Thomson-CSF. Solid state photonic detector with charge transfer reader and image-forming target using such a detector. 4,590,390, Cl. 307-311.000.

Arrigoni, John P., to United Technologies Corporation. Method for restoring a face on the shroud of a rotor blade. 4,589,175, Cl. 29-156.80B.

Artaud, Robert; Aubert, Michel; and Renaux, Charley, to Commissariat a l'Energie Atomique. Steam generator for a liquid metal-cooled reactor. 4,589,375, Cl. 122-504.000.

Arter, Thomas C.; and Ponticello, Ignazio S., to Eastman Kodak Company. Reduction of reticulation in gelatin-containing elements. 4,590,151, Cl. 430-537.000.

Arya, Satya P., to Ingersoll-Rand. Offset driver accessory. 4,589,501, Cl. 173-131.000.

Arzouman, Harry H., to Safe-T-Jack, Inc. Dual automobile jack for consumer use. 4,589,630, Cl. 254-7.00B.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Tomori, Yasumasa; Okudaira, Sadao; Aoki, Harumi; Urano, Fumio; and Morisawa, Tahei, 4,589,750, Cl. 354-271.100.

Asahi Optical Co., Ltd.: *See*—
Moriya, Yasuo; and Kagei, Kazunori, 4,590,248, Cl. 526-228.000.

Asahi Seiko Kabushiki Kaisha: *See*—
Abe, Hiroshi, 4,589,433, Cl. 133-5.00R.

Asai, Shigeru: *See*—
Hayashi, Keijiro: Awano, Toshimi; and Asai, Shigeru, 4,590,023, Cl. 264-46.500.

Asano, Kajio; Sato, Toshihiko; Oda, Haruo; Abe, Yasuaki; and Watanabe, Yoshitaka, to Honda Giken Kogyo Kabushiki Kaisha. Method and apparatus for mounting parts to both sides of a main body such as an automobile body. 4,589,184, Cl. 29-430.000.

Asano, Toshio: *See*—
Furomoto, Mitsuru; and Asano, Toshio, 4,590,238, Cl. 524-745.000.

Asea Stal AB: *See*—
Bergkvist, Jorgen, 4,589,841, Cl. 431-170.000.

Ashikawa, Noboru; Friedrich, Karl; and Lanzer, Heribert, to Honda Giken Kogyo Kabushiki Kaisha. Driving gear interaxle differential assembly for all-wheel-drive vehicles. 4,589,304, Cl. 74-701.000.

Ashland Oil, Inc.: *See*—
Gardikes, John J., 4,590,229, Cl. 523-143.000.
Pascoe, Ralph F., 4,590,293, Cl. 560-233.000.
Assink, Roger A.: *See*—
Fukushima, Eiichi; Roeder, Stephen B. W.; Assink, Roger A.; and Gibson, Atholl A. V., 4,590,427, Cl. 324-318.000.
Astro-Med, Inc.: *See*—
Sullivan, Michael J., 4,590,488, Cl. 346-76.0PH.
Astrom, Sture. Tunnel freezer. 4,589,264, Cl. 62-374.000.
AT&T Bell Laboratories: *See*—
Bridges, Thomas J.; and Strnad, Albert R., 4,589,729, Cl. 350-96.320.
Capasso, Federico; Gossard, Arthur C.; and Stavola, Michael J., 4,590,507, Cl. 357-28.000.
Clemons, Donald G.; and DePaolis, Michael V., Jr., 4,590,388, Cl. 307-202.100.
Dalton, John V.; Orlowsky, Kenneth J.; and Sinha, Ashok K., 4,589,928, Cl. 148-1.500.
di Borgoricco, Eugenio S., 4,590,432, Cl. 328-164.000.
Koenig, Andrew R., 4,590,470, Cl. 340-825.310.
Miller, Hubert A., 4,590,583, Cl. 364-724.000.
Atlantic Richfield Company: *See*—
Grey, Roger A.; White, John F.; and Beals, Eva M., 4,590,313, Cl. 568-907.000.
Isaacs, Bruce H., 4,590,172, Cl. 502-160.000.
Perkins, Thomas P., 4,589,491, Cl. 166-302.000.
Roy, Jeffery J., 4,589,194, Cl. 29-583.000.
Attig, George B. Golf ball and tee manipulating apparatus. 4,589,661, Cl. 273-32.500.
Atwell, Graham J.; Baguley, Bruce C.; Denny, William A.; and Rewcastle, Gordon W., to Development Finance Corporation of New Zealand. Acridinecarboxamide compounds. 4,590,277, Cl. 546-105.000.
Aubert, Michel: *See*—
Artaud, Robert; Aubert, Michel; and Renaux, Charley, 4,589,375, Cl. 122-504.000.
Audi AG: *See*—
Barske, Heiko; and Posch, Bernd, 4,590,568, Cl. 364-442.000.
Aujla, Sharanjit S.; Middlehurst, Richard J.; and Simpson, John P., to Northern Telecom Limited. Planar electronic filter element and a connector embodying such a filter. 4,589,720, Cl. 339-147.00R.
Aunsholt, Knud E. H., to Kryolitselskabet Oresund A/S. Fuel briquettes and method of making. 4,589,887, Cl. 44-16.00R.
Auten, Howard L. Rubbish container. 4,589,570, Cl. 220-404.000.
Autoflug GmbH: *See*—
Hoenigs, Michael; and Reuschenbach, Hermann, 4,589,172, Cl. 24-602.000.
Automated Packaging Systems, Inc.: *See*—
Lerner, Hershey; Easter, William M.; and Wehrmann, Rick S., 4,589,165, Cl. 17-11.000.
Automotive Engine Associates: *See*—
Showalter, Merle R., 4,589,383, Cl. 123-90.360.
Avalon Research: *See*—
Coad, George L., 4,589,380, Cl. 123-46.00R.
Avdel Limited: *See*—
Jeal, Harvey P., 4,589,155, Cl. 10-86.00A.
Awano, Toshimi: *See*—
Hayashi, Keijiro; Awano, Toshimi; and Asai, Shigeru, 4,590,023, Cl. 264-46.500.
Axthammer, Ludwig; and Wossner, Felix, to Fichtel & Sachs AG. Double-tube vibration damper. 4,589,528, Cl. 188-279.000.
Ayer, Donald E.: *See*—
Wallach, Donald P., deceased; Ayer, Donald E.; and Szmuszkovicz, Jacob, 4,590,187, Cl. 514-211.000.
Azuma, Tadashi: *See*—
Akamatsu, Yoshihiro; Azuma, Tadashi; and Ishida, Toshio, 4,590,534, Cl. 361-212.000.
B. F. Goodrich Company, The: *See*—
Chasar, Dwight W., 4,590,017, Cl. 558-73.000.
Lenczyk, John P., 4,590,317, Cl. 570-220.000.
Baatz, Henning; Rittscher, Dieter; and Lur, Hans-Joachim, to GNS Gesellschaft fur Nuklear-Service mbH. Method and apparatus for the packaging of radioactive wastes. 4,590,000, Cl. 252-633.000.
Babcock & Wilcox Company, The: *See*—
Berthold, John W., III, 4,589,286, Cl. 73-715.000.
Bach, Douglas R.: *See*—
Meloche, Kenneth R.; McLeish, James G.; Bach, Douglas R.; and Buchanan, Harry C., Jr., 4,589,676, Cl. 280-707.000.
Bach, Erik; and Dideriksen, Erling T., to Interlego A.G. Wheel, in particular for a toy building set. 4,589,702, Cl. 301-63.0PW.
Bach, Lars: *See*—
Porter, Andrew W.; and Bach, Lars, 4,589,288, Cl. 73-852.000.
Badgley, Laurence E.: *See*—
Eseifan, Ali H.; and Badgley, Laurence E., 4,589,417, Cl. 128-422.000.
Baez, Adriana: *See*—
Cox, Osvaldo; and Baez, Adriana, 4,590,275, Cl. 546-62.000.
Baguley, Bruce C.: *See*—
Atwell, Graham J.; Baguley, Bruce C.; Denny, William A.; and Rewcastle, Gordon W., 4,590,277, Cl. 546-105.000.
Bailey, Denis M., to Sterling Drug Inc. Gastric cytoprotection with sodium thiosulfate in oral administration of aspirin. 4,590,183, Cl. 514-163.000.
Baird Corporation: *See*—
Gilles, Pieter; and Schmitt, Jean-Claude, 4,590,165, Cl. 436-49.000.
Govaert, Johan A., 4,590,368, Cl. 250-207.000.
Baker, Scott C.: *See*—
Gaffney, Thomas E.; and Baker, Scott C., 4,589,629, Cl. 251-288.000.
Baldwin, Dan D., to Nautilus Sports/Medical Industries, Inc. Aerobic exercise device for increased user comfort. 4,589,656, Cl. 272-73.000.
Baldwin, David R.; and Hodgkiss, Douglas H., to Tokyo Shibaura Denki Kabushiki Kaisha. Data disc system for a computed tomography X-ray scanner. 4,590,559, Cl. 364-414.000.
Ball Corporation: *See*—
Frame, Wayne W.; and Trumbull, Robert E., 4,590,520, Cl. 358-163.000.
Ball, Lawrence E.: *See*—
Wu, Mu-Yen M.; and Ball, Lawrence E., 4,590,251, Cl. 526-311.000.
Balland, Francois. Mobile binding. 4,589,682, Cl. 281-46.000.
Ballantine, James A.; Gregory, Reginald; Purnell, John H.; Thomas, John M.; and Westlake, David J., to British Petroleum Company Limited, The. Proton-catalyzed reactions catalyzed by hydrogen ion-exchanged layered clays. 4,590,294, Cl. 560-247.000.
Balloni, Riccardo; and Keung, Jay, to Mobil Oil Corporation. Heat-sealable multi-layer film structures and methods of forming the same. 4,590,125, Cl. 428-349.000.
Balma, Capoduri & C., S.p.A.: *See*—
Balma, Giorgio, 4,589,581, Cl. 227-7.000.
Balma, Giorgio, to Balma, Capoduri & C., S.p.A. Electromechanical device for automating the operation of table staplers. 4,589,581, Cl. 227-7.000.
Bamji, Pervez J. F.; Evans, John F.; and Fitzpatrick, Nigel P., to Alcan International Limited. Apparatus for melting scrap metal and ingestion of solids in molten metal. 4,589,637, Cl. 266-234.000.
Banks, Robert L.: *See*—
Kukes, Simon G.; and Banks, Robert L., 4,590,174, Cl. 502-219.000.
Bar-on, Yair: *See*—
Yaniv, Zvi; Bar-on, Yair; Cannella, Vincent D.; and Hansell, Gregory L., 4,589,733, Cl. 350-332.000.
Barari, Hari B.; and Mullins, Lance A., to Joy Manufacturing Company. Fluidized bed classifier. 4,589,981, Cl. 209-474.000.
Barath, James D.; and Case, Steven K., to Medical Dynamics, Inc. Laser endoscope. 4,589,404, Cl. 128-6.000.
Barbee, Jack C., to Speizman Industries, Inc. Method and apparatus for producing hosiery article. 4,589,267, Cl. 66-12.000.
Barber, Bob, Jr.: *See*—
Parker, David L., 4,589,307, Cl. 81-62.000.
Barker, James E.; and Hadley, James C., to General Signal Corporation. Unitary bearing and locator assembly for rotatable valves. 4,589,628, Cl. 251-214.000.
Barker, Robert L.: *See*—
Toone, James R.; and Barker, Robert L., 4,590,590, Cl. 367-4.000.
Barnard, Timothy J.: *See*—
Nath, Prem; Barnard, Timothy J.; and Crea, Dominic, 4,590,327, Cl. 136-256.000.
Barnes, Frank E. Smoking apparatus. 4,589,427, Cl. 131-181.000.
Barnes-Hind, Inc.: *See*—
Lim, Draholav; and Morris, Peter C., 4,590,301, Cl. 568-633.000.
Barnhart, Gerald K. Fish lure. 4,589,222, Cl. 43-42.230.
Barske, Heiko; and Posch, Bernd, to Audi AG. Method of and device for operating a motor vehicle at a rate of fuel consumption related to distance. 4,590,568, Cl. 364-442.000.
Barth, Peter: *See*—
Cioca, Gheorge; Feeley, George F.; Brabson, Joseph B.; and Barth, Peter, 4,590,022, Cl. 264-41.000.
Barth, Wayne E., to Pfizer Inc. 6-substituted penicillanic acid 1,1-dioxide compounds. 4,590,073, Cl. 424-114.000.
Bartlett, Donald L.: *See*—
Booth, Roger G.; and Bartlett, Donald L., 4,590,097, Cl. 427-154.000.
Barto, John J., Jr.; Walsh, Peter M.; Fitzpatrick, Peter R.; Dondero, Richard F.; Demers, Kenneth P.; and Gardner, Stephen M., to United Technologies Corporation. Off-line programmable robot. 4,590,578, Cl. 364-513.000.
Barton, Piotr; Krzystolik, Pawel; Sliz, Jan; Dworok, Roman; Lebecki, Kazimierz; and Slotwinski, Ryszard, to Glowny Instytut Gornictwa. Device for measurement of content of loose mixtures components. 4,590,373, Cl. 250-308.000.
BASF Aktiengesellschaft: *See*—
Hagen, Helmut; Ziegler, Hans; and Wuerzer, Bruno, 4,589,910, Cl. 71-90.000.
Horn, Peter; Bunsch, Hellmut; Hesse, Anton; Marx, Matthias; Nissen, Dietmar; and Heckmann, Walter, 4,590,242, Cl. 525-183.000.
Nissen, Dietmar; Marx, Matthias; and Schmidt, Hans U., 4,590,219, Cl. 521-51.000.
Schornick, Gunnar; Jun, Mong-Jon; Sanner, Axel; Lehner, August; Lenz, Werner; Richter, Peter; and Eckell, Albrecht, 4,590,144, Cl. 430-273.000.
Varwig, Juergen; and Hamprecht, Gerhard, 4,590,016, Cl. 260-544.00F.
Wallbillich, Guenter, 4,590,146, Cl. 430-281.000.
Zeiner, Hartmut; Fischer, Jurgen; Heinz, Gerhard; Neumann, Peter; Nissen, Dietmar; and Schaefer, Gerhard, 4,590,104, Cl. 427-389.900.
BASF Corporation: *See*—
Korczak, Alexander; and Levis, William W., Jr., 4,590,225, Cl. 521-167.000.
BASF Wyandotte Corporation: *See*—
Donegan, Thomas E., 4,589,922, Cl. 106-308.00Q.

Bashilov, Viktor P.: *See—*
Malyshev, Boris N.; Saljuk, Viktor A.; Skobelkin, Oleg X.; Brekhov, Evgeny I.; Smirnov, Boris A.; Korolkov, Ivan A.; Bashilov, Viktor P.; and Ivanova, Tatyana L., 4,589,413, Cl. 128-305.000.

Bassi, Giuseppe. Hygienic device for covering water-closet ring-shaped seats and the like. 4,589,149, Cl. 4-242.000.

Battelle Development Corporation: *See—*
Allen, Billy R.; Huffman, William J.; and Nack, Herman, 4,589,927, Cl. 134-25.100.

Bauer, Hans J.: *See—*
Bauer, Hans-Peter; and Bauer, Hans J., 4,589,697, Cl. 297-300.000.

Bauer, Hans-Peter; and Bauer, Hans J., to Fritz Bauer & Sohne oHG. Bearing device for a chair with incline-adjustable back-rest bearer and incline-adjustable seat. 4,589,697, Cl. 297-300.000.

Bauer, Helmut: *See—*
Krob, Erwin; and Bauer, Helmut, 4,589,674, Cl. 280-633.000.

Bauman, Therese M.; and Freiberg, Alan L., to Dow Corning Corporation. Method of producing a silicone water-based elastomer. 4,590,220, Cl. 521-68.000.

Bauman, Therese M., to Dow Corning Corporation. Lower density silicone elastomeric foam. 4,590,222, Cl. 521-88.000.

Baumbach, James: *See—*
Glazer, Sam D.; Baumbach, James; Borg, Anita; and Wittels, Emanuel, 4,590,554, Cl. 364-200.000.

Baumer, Albrecht; Schneider, Werner; Muller-Spath, Hans-Jorg; and Brucher, Eberhard. Grasping device for a rod insertable into and withdrawable from the taphole of metallurgical furnaces, particularly tapping rods. 4,589,636, Cl. 266-271.000.

Bauver, Wesley P., II, to Combustion Engineering, Inc. Wood burning furnace. 4,589,353, Cl. 110-244.000.

Baxter Travenol Laboratories, Inc.: *See—*
Pearson, Stephen, 4,589,879, Cl. 604-411.000.

Bayer Aktiengesellschaft: *See—*
Boshagen, Horst; Horlein, Ulrich; Reinhardt, Gerd; Seuter, Friedel; and Perzborn, Elisabeth, 4,590,291, Cl. 560-64.000.
Brunn, Horst; Niggemann, Johannes; Kohler, Peter; and Hund, Franz, 4,589,906, Cl. 71-80.000.
Heiker, Fred R.; Muller, Lutz; Puls, Walter; and Bischoff, Hilmar, 4,590,179, Cl. 514-25.000.
Konig, Joachim; Suling, Carlhans; and Lindner, Christian, 4,590,236, Cl. 524-460.000.

Bayerische Motoren Werke AG: *See—*
Gurtler, Franz; and Wimmer, Robert, 4,589,680, Cl. 280-801.000.

Bayerische Motoren Werke A.G.: *See—*
Matschinsky, Wolfgang, 4,589,677, Cl. 280-726.000.

Bayh, Russell I., III, to Otis Engineering Corporation. Well production system. 4,589,482, Cl. 166-105.500.

BBC Brown, Boveri & Company, Limited: *See—*
Berta, Riccardo; and Perrenoud, Blaise, 4,590,343, Cl. 200-282.000.
Lanz, Otto; Maschek, Martin; and Mastner, Georg, 4,590,459, Cl. 340-347.0AD.
Masek, Jaroslav; and Suter, Franz, 4,589,444, Cl. 137-613.000.
von Bockh, Peter, 4,589,258, Cl. 60-679.000.

Beals, Eva M.: *See—*
Grey, Roger A.; White, John F.; and Beals, Eva M., 4,590,313, Cl. 568-907.000.

Bearpark, John P.: *See—*
Nelson, William; and Bearpark, John P., 4,589,469, Cl. 164-460.000.

Beauregard, Louis G.: *See—*
Porche, Michael N.; and Beauregard, Louis G., 4,590,416, Cl. 323-205.000.

Beaver, Richard P., to PPG Industries, Inc. Method of cleaning heat transfer fins. 4,589,898, Cl. 65-12.000.

Beck, James R., to Eli Lilly and Company. Herbicidal and algicidal 1-aryl-5-cyano-1H-pyrazole-4-carboxamides. 4,589,905, Cl. 71-66.000.

Becker, Kunibert: *See—*
Beckmann, Klaus; and Becker, Kunibert, 4,589,701, Cl. 299-72.000.

Beckman Instruments, Inc.: *See—*
Cragle, Linda K.; Harris, Paul C.; Lee, Shih-Yun; Tung, Ker-Kong; and Vodian, Morton A., 4,590,169, Cl. 436-523.000.
Kampf, Richard S., 4,589,540, Cl. 198-345.000.
Meyer, Richard C.; and Pang, Wing S., 4,589,298, Cl. 74-441.000.

Beckmann, Klaus; and Becker, Kunibert, to Gewerkschaft Eisenhutte Westfalia. Cutting machine. 4,589,701, Cl. 299-72.000.

Becton, Dickinson and Company: *See—*
Imbert, Claude, 4,589,871, Cl. 604-240.000.
Johnson, Michael D., 4,589,940, Cl. 156-78.000.
Schwartz, Abraham; Graper, Jane; and Williams, Joel, 4,589,873, Cl. 604-265.000.

Bedell, John R.; Friedmann, Paul G.; Kushnick, Julian H.; Rosenthal, Eli; Hubbard, James R.; and Zingler, Christian J., to Electric Power Research Institute Inc. Method and apparatus for cooling a moving chill substrate. 4,589,470, Cl. 164-463.000.

Beecham Group p.l.c.: *See—*
Fake, Charles S.; and Burrell, Gordon, 4,590,192, Cl. 514-231.000.

Beeman, Robert H.; and Lind, Paul U., to GTE Communication Systems Corporation. Dynamic digital equalizer. 4,590,600, Cl. 375-99.000.

Beeman, Robert H., to GTE Communication Systems Corporation. Pseudo random framing detector circuit. 4,590,601, Cl. 375-115.000.

Beghin-Say S.A.: *See—*
Holvoet, Marcel, 4,589,166, Cl. 19-82.000.
Mitrani, Sem, 4,589,878, Cl. 604-392.000.

Behrens, Robert N. Horizontal drilling apparatus. 4,589,499, Cl. 173-22.000.

Behrens, Robert S. Slatted bed system. 4,589,151, Cl. 5-66.000.

Behringer, Uwe; Greschner, Johann; and Trumpp, Hans-Joachim, to International Business Machines Corporation. Method of making trenches with substantially vertical sidewalls in silicon through reactive ion etching. 4,589,952, Cl. 156-628.000.

Beimesch, Bruce J.: *See—*
Zehler, Eugene R.; and Beimesch, Bruce J., 4,589,990, Cl. 252-56.00S.

Bekheet, Zaki C.: *See—*
Strikis, Guntis V.; and Bekheet, Zaki C., 4,589,536, Cl. 192-35.000.

Bell, Harvey: *See—*
Miller, Birgit J.; Bell, Harvey; and Wojcak, Eugene, 4,590,084, Cl. 426-557.000.

Belli, Remo; and Hartry, Donald R., to Remo, Inc. Drum muffler. 4,589,323, Cl. 84-411.00R.

Bellin, Matthew E.; and Marino, Joseph A., Jr. Quick action flow regulator for medical apparatus. 4,589,872, Cl. 604-246.000.

Beloit Corporation: *See—*
Ellery, John M., Sr., 4,589,598, Cl. 241-37.000.

Belvederi, Bruno: *See—*
Riccardo, Mattei; and Belvederi, Bruno, 4,589,811, Cl. 414-224.000.

Ben-Dov, Oded, to RCA Corporation. Broadcast antenna system with high power aural/visual self-diplexing capability. 4,590,479, Cl. 343-771.000.

Ben-Gurion University of the Negev Research and Development Authority: *See—*
Trop, Moshe, 4,590,077, Cl. 426-61.000.

Ben Venue Laboratories, Inc.: *See—*
Kaye, Saul, 4,590,037, Cl. 422-116.000.

Bennett, Edward M.: *See—*
Clark, Charles J.; and Bennett, Edward M., 4,589,341, Cl. 102-303.000.

Bennett, Everett W.; and Suchy, Jan B., to James River Graphics, Inc. Organic photoconductors having improved pre-exposure fatigue resistance and blooming properties. 4,590,006, Cl. 260-393.000.

Bennett, Everett W.: *See—*
Desjarlais, Robert C.; and Bennett, Everett W., 4,590,263, Cl. 534-558.000.

Bennett, James G., Jr.; and Tungate, Freddie L., to General Electric Company. Catalyst precursor prepared from manganese carbonate, and use of a calcined derivative in an ortho-alkylation process. 4,590,307, Cl. 568-804.000.

Benson, Michael R.; and Hill, William D., to General Electric Company. Analog signal conditioner for thermal coupled signals. 4,590,472, Cl. 340-870.040.

Berbeco, George R., to Charleswater Products, Inc. Fibrous sheet material for conductive high-pressure laminate. 4,589,954, Cl. 162-138.000.

Bergamo, Robert L.: *See—*
Lambert, Robert L.; Nagel, Judy A.; and Bergamo, Robert L., 4,590,138, Cl. 430-25.000.

Bergener, Derek W.: *See—*
Pompea, Stephen M.; Bergener, Derek W.; and Shepard, Donald F., 4,589,972, Cl. 204-29.000.

Berger, Joseph: *See—*
Riediker, Martin; Roth, Martin; Buhler, Niklaus; and Berger, Joseph, 4,590,287, Cl. 556-53.000.

Berger, Michael F.; and Sawyer, Sammy D., to Tandy Corporation. Co-processor combination. 4,590,556, Cl. 364-200.000.

Bergkvist, Jorgen, to Asea Stal AB. Cap for nozzles in an after combustion fluidized bed. 4,589,841, Cl. 431-170.000.

Bernard, Jurgen, to ERSA Ernst Sachs KG GmbH & Co. Circuit for controlling temperature of electric soldering tool. 4,590,363, Cl. 219-497.000.

Berner, Erling. Air ventilation and filtration apparatus. 4,589,476, Cl. 165-54.000.

Bernhardt, Siegfried, to Spinnbau GmbH. Apparatus for introducing a pile into a following roller system. 4,589,167, Cl. 19-106.00R.

Bernstein, Joel E., to Soft Sheen Products, Inc. Method of increasing the rate of wound healing and composition. 4,590,212, Cl. 514-629.000.

Berta, Riccardo; and Perrenoud, Blaise, to BBC Brown, Boveri & Company, Limited. Knife blade and clip contact arrangement. 4,590,343, Cl. 200-282.000.

Berthet, Jeanne; Blin, Marie-Francoise; and Gaussens, Gilbert, to Compagnie ORIS Industrie S.A. Inert cross-linked copolymer support, its preparation process and its use for producing delayed action medicaments. 4,590,068, Cl. 424-81.000.

Berthold, John W., III, to Babcock & Wilcox Company, The. Fused silica diaphragm module for high temperature pressure transducers. 4,589,286, Cl. 73-715.000.

Bertozzi, Eugene R.: *See—*
Streeter, Bruce E.; MacMillan, John H.; and Bertozzi, Eugene R., 4,590,240, Cl. 525-123.000.

Bertrand, William J.: *See—*
Mayhan, Kenneth G.; Janssen, Robert A.; and Bertrand, William J., 4,589,964, Cl. 522-85.000.

Berwind Corporation: *See—*
Weggel, Ralph W., 4,589,831, Cl. 425-195.000.

Best Lock Corporation: *See—*
Foshee, William R.; and Carey, Kevin, 4,589,691, Cl. 292-165.000.

Bethlehem Steel Corporation: *See—*
Stitz, Walter L., 4,589,933, Cl. 148-143.000.

BICC Public Limited Company: *See—*
Nelson, William; and Bearpark, John P., 4,589,469, Cl. 164-460.000.

Bickerstaff, David J., to Ferro Manufacturing Corporation. Side window glass regulator for quarter windows on convertibles. 4,589,227, Cl. 49-227.000.

Bilka, Kenneth P.: *See—*
Wei, You C.; Cherukuri, Subraman R.; Hriscisce, Frank; Piccolo, Dominic J.; and Bilka, Kenneth P., 4,590,075, Cl. 426-5.000.

Bilotti, Federico, to Senmed, Inc. Cartridge and driver assembly for a surgical stapling instrument. 4,589,582, Cl. 227-19.000.

Binder, Dieter; and Noe, Christian, to Laevosan-Gesellschaft m.b.H. & Co. KG. Derivatives of thiophene-2-carboxylic acid and their pharmaceutically acceptable acid or base addition salts and use in treatment of conditions caused by thromboxane A_2. 4,590,203, Cl. 514-397.000.

Biomedical Polymers, Inc.: *See—*
Fay, John E., 4,589,548, Cl. 206-363.000.

BioResearch Inc.: *See—*
Kurtz, Leonard D.; and LiCausi, Joseph, 4,589,626, Cl. 251-10.000.

Bischoff, Hilmar: *See—*
Heiker, Fred R.; Muller, Lutz; Puls, Walter; and Bischoff, Hilmar, 4,590,179, Cl. 514-25.000.

Blackwell, Joseph T.; Daughety, Harold L.; Grace, Henry C.; and Oliver, Ward H., to Ciba-Geigy Corporation. Process for the manufacture of cyclopropylamine. 4,590,292, Cl. 560-124.000.

Blair, Kelvin R.: *See—*
Stewart, Timothy C.; Ofman, Leo; Blair, Kelvin R.; and Gregg, Randolph M., 4,589,547, Cl. 206-328.000.

Blakers, Andrew W.: *See—*
Green, Martin A.; and Blakers, Andrew W., 4,589,191, Cl. 29-572.000.

Bleickert, Gerhard. Furnace for smelting non-ferrous and/or for holding non-ferrous metal melts. 4,589,634, Cl. 266-215.000.

Blin, Marie-Francoise: *See—*
Berthet, Jeanne; Blin, Marie-Francoise; and Gaussens, Gilbert, 4,590,068, Cl. 424-81.000.

Blodgett, Jerry A.: *See—*
Patten, Raymond A.; and Blodgett, Jerry A., 4,589,772, Cl. 356-353.000.

Blount, Alonzo: *See—*
Pieroway, Chesley S.; Blount, Alonzo; Britton, George L.; and Krile, David J., 4,590,471, Cl. 340-825.690.

Blum, Alex, to Sprecher & Schuh AG. Electromagnetic switch apparatus. 4,590,450, Cl. 335-129.000.

Blumbach, Jurgen: *See—*
Scheunemann, Karl-Heinz; Mencke, Burkhard; Blumbach, Jurgen; Durckheimer, Walter; and Fleischmann, Klaus, 4,590,267, Cl. 544-27.000.

Bluzer, Nathan, to United States of America, Air Force. Three dimensional optical receiver having programmable gain sensor stages. 4,590,505, Cl. 357-24.000.

Boardman, Terence D.: *See—*
Forrester, Raymond B.; and Boardman, Terence D., 4,590,206, Cl. 514-456.000.

BOC Group, Inc., The: *See—*
Townsend, Palmer W.; Huang, Chialang; and Vernice, Gerald G., 4,590,310, Cl. 568-842.000.

Boccelli, Fred A.: *See—*
Sedig, Albert R.; and Boccelli, Fred A., 4,589,721, Cl. 339-210.00R.

Bocchi, Curtis J.; Eide, Donald A.; and Hart, Rebecca A., to Honeywell Inc. Circuit for converting the phase encoded hue information of a quadrature modulated color subcarrier into distinct analog voltage levels. 4,590,511, Cl. 358-21.00R.

Bochis, Richard J.; Chabala, John C.; and Fisher, Michael H., to Merck & Co., Inc. 5-amino or substituted amino 1,2,3-triazoles. 4,590,201, Cl. 514-359.000.

Boeing Company, The: *See—*
Jones, Philip; Jones, William R.; and Storey, Moorfield, Jr., 4,589,770, Cl. 356-1.000.
Opsahl, Allan W., 4,589,613, Cl. 244-129.500.
Steadman, Stephen T., 4,589,542, Cl. 198-782.000.

Bogan, Richard T.; and Kuo, Chung-Ming, to Eastman Kodak Company. Carboxylated cellulose ester and manufacture thereof. 4,590,265, Cl. 536-63.000.

Bollmann, Armin A. Mounting means for (releasably and movably) mounting devices on a wall, particularly in clinics, first aid or surgery rooms, and the like; and manufacturing method for said mounting means. 4,589,557, Cl. 211-94.000.

Boltrek, Henry; and Parvis, Edward F., to Westinghouse Electric Corp. Transportation apparatus having a moving handrail. 4,589,539, Cl. 198-331.000.

Bond, Ralph W.; and Pitz, Harold W., to Amana Refrigeration, Inc. Locking cover for air conditioner. 4,589,709, Cl. 312-257.00A.

Booth, Roger G.; and Bartlett, Donald L. Method of coating dual protective layers. 4,590,097, Cl. 427-154.000.

Booth, Ronald P., Sr.: *See—*
Perun, William D.; and Booth, Ronald P., Sr., 4,589,765, Cl. 355-3.0SH.

Borg, Anita: *See—*
Glazer, Sam D.; Baumbach, James; Borg, Anita; and Wittels, Emanuel, 4,590,554, Cl. 364-200.000.

Borg-Warner Corporation: *See—*
Roberts, Richard W., 4,589,303, Cl. 74-689.000.

Born, Gerald W., to Quality Products, Inc. High-pressure container and method of making the same. 4,589,563, Cl. 220-3.000.

Borrow, Edgar W. Packaging apparatus. 4,589,946, Cl. 156-513.000.

Borsig GmbH: *See—*
Kehrer, Wolfgang, 4,589,473, Cl. 165-1.000.

Boschetti, Egisto: *See—*
Girot, Pierre; and Boschetti, Egisto, 4,590,424, Cl. 324-204.000.

Boshagen, Horst; Horlein, Ulrich; Reinhardt, Gerd; Seuter, Friedel; and Perzborn, Elisabeth, to Bayer Aktiengesellschaft. Thrombin inhibitory new dihydroxybenzene ether derivatives. 4,590,291, Cl. 560-64.000.

Boughton, Thomas T., to T. T. Boughton & Sons Ltd. Load carrying road vehicles. 4,589,671, Cl. 280-433.000.

Bourrez, Jean-Marie, to Compagnie Internationale pour l'Informatique Cii-Honeywell Bull (Societe Anonyme). Apparatus for synchronizing and allocating processes among several processors of a data processing system. 4,590,555, Cl. 364-200.000.

Bousquet, Jean: *See—*
Arnoux, Daniel; Bousquet, Jean; and Genter, Claude, 4,590,421, Cl. 324-62.000.

Boutto, Uuno J.; and Spector, George. Gravity pull rotor. 4,589,259, Cl. 60-698.000.

Bouygues: *See—*
Richard, Pierre, 4,589,157, Cl. 14-73.000.

Bowman, Bonita F.; Pann, Keh; and Redeker, Maynard S., to Mobil Oil Corporation. Display of response characteristics of seismic source arrays. 4,590,592, Cl. 367-68.000.

Boychuk, Walter P.: *See—*
Grace, Wallace C.; and Boychuk, Walter P., 4,589,305, Cl. 76-107.00R.

Boyd, Elihu K., to Hamilton, David R.; and Hamilton, Barbara J. Portable door lock. 4,589,692, Cl. 292-297.000.

Boyle, George J.; and Pritchard, Frederick R., to Shell Oil Company. Method and apparatus for continuously detecting and monitoring the hydrocarbon dew-point of a gas. 4,589,274, Cl. 73-29.000.

Bozarth, Gene A.: *See—*
Pilgram, Kurt H.; and Bozarth, Gene A., 4,589,913, Cl. 71-93.000.

Brabson, Joseph B.: *See—*
Cioca, Gheorge; Feeley, George F.; Brabson, Joseph B.; and Barth, Peter, 4,590,022, Cl. 264-41.000.

Bragg, James R.; and Gale, Walter W., to Exxon Production Research Co. Method for treating oil-water emulsions and recovering surfactants. 4,589,998, Cl. 252-330.000.

Bramwell, David W. Trunking. 4,589,449, Cl. 138-162.000.

Brand-Rex Company: *See—*
Gentry, John M.; and Archer, Lee A., 4,589,719, Cl. 339-126.00R.

Brandenstein, Manfred; Haas, Roland; Herrmann, Gerhard; Dobhan, Herbert; and Hans, Rudiger, to SKF Kugellagerfabriken GmbH. Gear and method for making the same. 4,589,860, Cl. 474-161.000.

Braun, Dieter; and Mehren, Herbert, to Daimler-Benz Aktiengesellschaft. Active suspension system. 4,589,675, Cl. 280-707.000.

Braune, Rudolf E.: *See—*
Loukas, Paul W.; Braune, Rudolf E.; and Fischer, Ekkehard, 4,589,844, Cl. 432-223.000.

Braunschweigische Maschinenbauanstalt: *See—*
Gruenewald, Werner, 4,589,923, Cl. 127-4.000.

Breckinridge Minerals, Inc.: *See—*
Minden, Carl S., 4,589,973, Cl. 208-410.000.

Breda, Silvano. Diverter valve with integral atmospheric type vacuum breaker. 4,589,438, Cl. 137-218.000.

Breimesser, Fritz; Hassler, Dietrich; Hundt, Eckart; Maderlechner, Gerd; and Trautenberg, Elmar, to Siemens Aktiengesellschaft. Ultrasonic tomography unit. 4,589,284, Cl. 73-626.000.

Brekhov, Evgeny I.: *See—*
Malyshev, Boris N.; Saljuk, Viktor A.; Skobelkin, Oleg X.; Brekhov, Evgeny I.; Smirnov, Boris A.; Korolkov, Ivan A.; Bashilov, Viktor P.; and Ivanova, Tatyana L., 4,589,413, Cl. 128-305.000.

Brennan, John J.; Chyung, Kenneth; and Taylor, Mark P., to United Technologies Corporation. High-strength thermally stable magnesium aluminosilicate glass-ceramic matrix sic fiber composite. 4,589,900, Cl. 65-33.000.

Breum, Jens, to Kahler & Breum. Container. 4,589,643, Cl. 220-5.00R.

Brewer, John: *See—*
Anderson, Thomas T.; Roop, Conard J.; Schmidt, Kenneth J.; and Brewer, John, 4,590,431, Cl. 324-443.000.

Brewster, Arthur E., to International Standard Electric Corporation. Infra-red light absorption gas detector. 4,590;374, Cl. 250-338.000.

Bridgeford, Douglas J., to Teepak, Inc. Thin-walled, low plasticized content regenerated cellulose sausage casing. 4,590,107, Cl. 428-36.000.

Bridges, Thomas J.; and Strnad, Albert R., to AT&T Bell Laboratories. Apparatus comprising an articulated arm radiation guide. 4,589,729, Cl. 350-96.320.

Bridgestone Corporation: *See—*
Inoue, Seizaburo; and Smith, Norvel L., 4,589,834, Cl. 425-369.000.
Ohkuni, Shinichiro; and Kitazawa, Yoichi, 4,589,461, Cl. 152-209.00R.

Bridgestone Tire Co., Ltd.: *See—*
Hashimoto, Takatsugu; and Ohashi, Takashi, 4,590,123, Cl. 428-316.600.

Bridgestone (U.S.A.), Inc.: *See—*
Inoue, Seizaburo; and Smith, Norvel L., 4,589,834, Cl. 425-369.000.

Brigham Young University: *See—*
Allen, Dell K., 4,589,174, Cl. 29-33.00R.

Bright, John H., to American Cyanamid Company. Process for the preparation of 6-methoxy-1-naphthoic acid, methyl esters. 4,590,290, Cl. 560-56.000.

Brisson, Alfred: *See—*
Nowacki, Christopher; and Brisson, Alfred, 4,589,684, Cl. 285-319.000.

Bristol, Lloyd R., to Tektronix, Inc. Scale illumination lamp control circuit for an oscilloscope. 4,590,407, Cl. 315-208.000.

Bristol-Myers Company: *See—*
Smith, David W.; and Yevich, Joseph P., 4,590,196, Cl. 514-253.000.
Vyas, Dolatrai M.; Kaneko, Takushi; and Doyle, Terrence W., 4,590,074, Cl. 544-58.200.

British Petroleum Company Limited, The: *See—*
Ballantine, James A.; Gregory, Reginald; Purnell, John H.; Thomas, John M.; and Westlake, David J., 4,590,294, Cl. 560-247.000.

Britt Corporation: *See—*
O'Harra, Dale G., II, 4,590,598, Cl. 372-38.000.

Britton, George L.: *See—*
Pieroway, Chesley S.; Blount, Alonzo; Britton, George L.; and Krile, David J., 4,590,471, Cl. 340-825.690.

Brockhaus, Donald B.; Fuehrer, Calvin L.; Swartz, Walter E.; and Sietmann, Vernon H., to Stormor, Inc. Flashing system for a grain drying bin. 4,589,332, Cl. 98-55.000.

Brockmann, Hermann: *See—*
Horch, Frank; Brockmann, Hermann; and Fuchs, Hans-Georg, 4,589,623, Cl. 249-83.000.

Brodeur, Rene H.; and Terlecky, Boris S., to Trailer Train Company. Railroad car with universal coupling capability. 4,589,558, Cl. 213-50.000.

Broggi, Renato: *See—*
Marsili, Leonardo; Falciani, Marco; and Broggi, Renato, 4,590,185, Cl. 514-183.000.

Bronicki, Lucien Y., to Ormat Turbines, Ltd. Method and means for peaking or peak power shaving. 4,590,384, Cl. 290-4.00C.

Bronzavia: *See—*
Joly, Claude, 4,590,116, Cl. 428-182.000.

Brose Fahrzeugteile GmbH & Co. KG: *See—*
Mann, Bernd; Schneyer, Gerhard; and Dinkel, Emil, 4,589,297, Cl. 74-427.000.

Brother Kogyo Kabushiki Kaisha: *See—*
Imaizumi, Mamoru; and Shibata, Kiyoshi, 4,590,464, Cl. 340-711.000.

Brown, Alfred; Haynes, Stewart; Alves, Gerald W.; and Lim, Frank H., to Texaco Inc. Carbon dioxide flooding with a premixed transition zone of carbon dioxide and crude oil components. 4,589,486, Cl. 166-252.000.

Brown, Boveri & Cie AG: *See—*
Buehler, Werner; Mennicke, Stefan; Reiss, Karl; and Terharn, Susanne, 4,590,136, Cl. 429-104.000.

Brown, Craig A.: *See—*
Lincoln, James F. L.; Buder, Manfred K.; Brown, Craig A.; Golike, Gregory P.; and Spurrell, Robert M., 4,589,357, Cl. 110-347.000.

Brown, Eric K.: *See—*
Darr, Carey D. K.; and Brown, Eric K., 4,589,490, Cl. 166-276.000.

Brown, James P.; Carroll, William G.; May, Ronald N.; Merckx, Erik M. B.; and Sparrow, David J., to Imperial Chemical Industries Inc. Polyether polyols containing hydroxymethyl substituted 1,3-dioxane for use in polyurethanes. 4,590,226, Cl. 521-174.000.

Brown, Jerry A., to United States of America, Army. Stall avoidance system for aircraft. 4,590,475, Cl. 340-966.000.

Brown, John B.; and Kelley, Reginald D., to Force Control Industries, Inc. Apparatus for rotating and reciprocating a transfer member. 4,589,818, Cl. 414-744.00A.

Brown, Richard K.; and Maroszek, Raymond V., to James River-Dixie/Northern, Inc. Microwave cooking carton for browning and crisping food on two sides. 4,590,349, Cl. 219-10.55E.

Brucher, Eberhard: *See—*
Baumer, Albrecht; Schneider, Werner; Muller-Spath, Hans-Jorg; and Brucher, Eberhard, 4,589,636, Cl. 266-271.000.

Bruker Analytische Messtechnik GmbH: *See—*
Muller, Wolfgang; and Knuttel, Bertold, 4,590,428, Cl. 324-320.000.

Brumfield, Timothy L.: *See—*
Nukala, August R.; Perez, Arthur; and Brumfield, Timothy L., 4,589,955, Cl. 196-114.000.

Brunelle, Daniel J., to General Electric Company. Boron- and nitrogen-containing compositions and their use in polycarbonate and polyester-polycarbonate synthesis. 4,590,257, Cl. 528-176.000.

Brunn, Horst; Niggemann, Johannes; Kohler, Peter; and Hund, Franz, to Bayer Aktiengesellschaft. Inorganic depot fertilizers. 4,589,906, Cl. 71-80.000.

Brunnegard, Ake: *See—*
Nilsson, Erik W.; Brunnegard, Ake; and Ring, Hans, 4,589,793, Cl. 403-13.000.

Brunner, Josef: *See—*
Rock, Erich; and Brunner, Josef, 4,589,710, Cl. 312-330.00R.

Brunswick Corp.: *See—*
Hundertmark, James M., 4,589,378, Cl. 123-41.020.
Karls, Michael A., 4,589,851, Cl. 440-88.000.

Bry-Air, Inc.: *See—*
Leonard, David M., 4,589,892, Cl. 55-162.000.

BSD Medical Corporation: *See—*
Turner, Paul F., 4,589,423, Cl. 128-804.000.

Buchanan, Harry C., Jr.: *See—*
Meloche, Kenneth R.; McLeish, James G.; Bach, Douglas R.; and Buchanan, Harry C., Jr., 4,589,676, Cl. 280-707.000.

Bucking, Hans-Walter: *See—*
Rieck, Hans-Peter; Kalz, Hans-Jurgen; May, Adolf; Quack, Jochen M.; and Bucking, Hans-Walter, 4,589,988, Cl. 252-8.800.

Buder, Manfred K.: *See—*
Lincoln, James F. L.; Buder, Manfred K.; Brown, Craig A.; Golike, Gregory P.; and Spurrell, Robert M., 4,589,357, Cl. 110-347.000.

Buehler, Werner; Mennicke, Stefan; Reiss, Karl; and Terharn, Susanne, to Brown, Boveri & Cie AG. Electrochemical storage cell of the alkali metal and chalcogen type. 4,590,136, Cl. 429-104.000.

Buening, Gerald M.; and Carson, Charles A., to University of Missouri, Curators of the. Live vaccine for bovine babesiosis and method of preparation. 4,590,072, Cl. 424-93.000.

Buhler, Niklaus: *See—*
Riediker, Martin; Roth, Martin; Buhler, Niklaus; and Berger, Joseph, 4,590,287, Cl. 556-53.000.

Buhrer, Carl F., to GTE Laboratories Incorporated. Optical fiber rotary switch. 4,589,726, Cl. 350-96.200.

Bukkems, Franciscus H. J.: *See—*
Mos, Arie L.; and Bukkems, Franciscus H. J., 4,590,044, Cl. 422-191.000.

Bull, Randy A., to FMC Corporation. Process for epoxidizing an olefin. 4,590,286, Cl. 549-526.000.

Bunsch, Hellmut: *See—*
Horn, Peter; Bunsch, Hellmut; Hesse, Anton; Marx, Matthias; Nissen, Dietmar; and Heckmann, Walter, 4,590,242, Cl. 525-183.000.

Burditt, Vernon K. Focal finder for parabolic reflector antenna. 4,590,481, Cl. 343-840.000.

Burgit, Richard A.; Davis, Newton G.; Goyert, Josita M.; Johnson, Keith, Jr.; Long, Robert A.; and Stachura, Joseph F., to AMP Incorporated. Applicator for applying an electrical connector to a cable. 4,589,200, Cl. 29-753.000.

Burke, Timothy M.; Noble, Scott W.; Freeburg, Thomas A.; and Krebs, Jay R., to Motorola, Inc. Data signalling system. 4,590,473, Cl. 340-825.520.

Burkett, Bill E., to United States of America, Air Force. Tracking servo compensator with rate aiding. 4,590,476, Cl. 343-7.400.

Buro Patent AG: *See—*
Pircher, Herbert, 4,589,567, Cl. 220-326.000.

Burrage, Robert G.; Glaze, Stanley G.; and Tipton, James, to Lucas Industries. Control system primarily responsive to signals from digital computers. 4,590,549, Cl. 364-131.000.

Burrell, Gordon: *See—*
Fake, Charles S.; and Burrell, Gordon, 4,590,192, Cl. 514-231.000.

Burroughs Corporation: *See—*
Kearns, Peter J. M., 4,589,683, Cl. 282-11.50A.
Mathews, Ronald D., 4,590,551, Cl. 364-200.000.
Warner, Nicholas M., 4,590,527, Cl. 360-78.000.

Burroughs Wellcome Co.: *See—*
Daluge, Susan M.; Skonezny, Paul M.; Roth, Barbara; and Rauckman, Barbara S., 4,590,271, Cl. 544-324.000.

Burton, David P.; and Real, Peter, to Analog Devices, Incorporated. Low leakage CMOS D/A converter. 4,590,456, Cl. 340-347.0DA.

Busse-Machukas, Vladimir B.: *See—*
Yurkov, Leonid I.; Busse-Machukas, Vladimir B.; Lvovich, Florenty I.; Kubasov, Vladimir L.; Uzbekov, Alexandr A.; Mazanko, Anatoly F.; and Fedotova, Natalya S., 4,589,969, Cl. 204-290.00F.

Butler, Donald E., to Warner-Lambert Company. 5-oxo-2,2-pyrrolidinedipropanoic acid and derivatives as cognition activators. 4,590,204, Cl. 514-424.000.

Butler, Scott J.; Regan, Robert J.; and Varallo, Anthony B., to GTE Laboratories Incorporated. High voltage, high frequency amplifier circuit. 4,590,436, Cl. 330-277.000.

Butler, Scott J.; Regan, Robert J.; and Varallo, Anthony B., to GTE Laboratories Incorporated. High frequency amplifier. 4,590,437, Cl. 330-277.000.

Butler, Tony W., Jr. Structures for solar wind buildings. 4,589,820, Cl. 415-2.00R.

Buxmann, Kurt, to Swiss Aluminium Ltd. Process for preventing metal penetrating between a mold wall and a nozzle. 4,589,472, Cl. 164-472.000.

Bynum, Byron G.: *See—*
Cave, David L.; and Bynum, Byron G., 4,590,389, Cl. 307-303.000.

Byrne, Brian; and Lawter, Louise M. L., to Hercules Incorporated. Pineapple ketone 1'-alkoxyalkyl derivatives. 4,590,284, Cl. 549-477.000.

C. Reichert Optische Werke, AG: *See—*
Schindl, Klaus, 4,589,742, Cl. 350-589.000.

Cabestany, Jean; Siegel, Daniel; and Righetti, Roland, to Societe Francaise Hoechst. Cationic ampholytic tetrapolymers and cosmetic compositions containing them. 4,590,249, Cl. 526-287.000.

Caledonian Mining Company Ltd.: *See—*
MacLeod, Colin J., 4,589,795, Cl. 403-233.000.

Calgon Corporation: *See—*
Yorke, Monica A., 4,589,985, Cl. 210-699.000.

Cameron Iron Works, Inc.: *See—*
Kelly, Thomas P.; and Fisher, Edmund A., 4,589,493, Cl. 166-341.000.

Cameron, John T., to Thetford Corporation. Toilet hinge. 4,589,148, Cl. 4-236.000.

Campau, Daniel N. System for controlling liquid flow. 4,589,441, Cl. 137-512.000.

Campbell, Simon F.: *See—*
Alker, David; Cross, Peter E.; and Campbell, Simon F., 4,590,195, Cl. 514-252.000.

Canadian Patents and Development Limited: *See—*
Lahti, Howard R.; and Lahti, Wallace R., 4,590,348, Cl. 219-10.55M.

Cannella, Vincent D.: *See—*
Yaniv, Zvi; Bar-on, Yair; Cannella, Vincent D.; and Hansell, Gregory L., 4,589,733, Cl. 350-332.000.
Cannon Mills Company: *See—*
Starnes, Dennis L.; Kimball, William G.; and Keziah, David K., 4,589,361, Cl. 112-262.300.
Canon Denshi Kabushiki Kaisha: *See—*
Seki, Mitsuaki; Watanabe, Satoshi; and Miyakawa, Hideaki, 4,589,787, Cl. 400-145.200.
Canon Kabushiki Kaisha: *See—*
Ichihashi, Hiroo; Toganoh, Shigeo; and Matsufuji, Yohji, 4,590,494, Cl. 346-140.00R.
Ikeda, Yoshinori; and Matsuoka, Nobuo, 4,590,514, Cl. 358-75.000.
Imai, Eiichi; and Urawa, Motoo, 4,590,139, Cl. 430-45.000.
Kanoto, Masanobu, 4,589,654, Cl. 271-314.000.
Kasama, Nobuhiro; and Kurata, Mitsuru, 4,589,758, Cl. 355-3.0FU.
Kawai, Tohru, 4,589,753, Cl. 354-400.000.
Matsuki, Toshio, 4,589,769, Cl. 355-71.000.
Mitsuhashi, Yasuo; Takenouchi, Masanori; Tajima, Hatsuo; Uchiyama, Masaki; Urawa, Motoo; and Okado, Kenji, 4,590,140, Cl. 430-102.000.
Okamura, Shigeru, 4,590,495, Cl. 346-140.00R.
Sado, Ichiro, 4,590,560, Cl. 364-419.000.
Seki, Mitsuaki; Watanabe, Satoshi; and Miyakawa, Hideaki, 4,589,787, Cl. 400-145.200.
Toyono, Tsutomu; Sakemi, Yuji; and Fujii, Haruo, 4,590,496, Cl. 346-153.100.
Uramoto, Yuji, 4,590,485, Cl. 346-76.0PH.
Yamazaki, Masuo; Matsumoto, Toru; Wakamiya, Katsutoshi; Ohsaki, Ichiro; Nakahara, Toshiaki; and Ushiyama, Hisayuki, 4,590,142, Cl. 430-138.000.
Yanagi, Masaaki; Ono, Satoshi; Toda, Takao; Kashiwagi, Kazuo; Endo, Makoto; and Saito, Yoshihiro, 4,589,767, Cl. 355-45.000.
Canyon Corporation: *See—*
Tada, Tetsuya, 4,589,573, Cl. 222-153.000.
Capasso, Federico; Gossard, Arthur C.; and Stavola, Michael J., to AT&T Bell Laboratories. Variable gap devices. 4,590,507, Cl. 357-28.000.
Capdeboscq, Bernard: *See—*
Torti, Mario; and Capdeboscq, Bernard, 4,589,944, Cl. 156-359.000.
Carborundum Abrasives Company: *See—*
Parekh, Dhan N.; and Williams, David E., 4,589,233, Cl. 51-399.000.
Cardiac Pacemakers, Inc.: *See—*
Gopikanth, Mysore L., 4,589,418, Cl. 128-635.000.
Carey, Kevin: *See—*
Foshee, William R.; and Carey, Kevin, 4,589,691, Cl. 292-165.000.
Carlson, James M.: *See—*
Adams, Isabelle M.; Carlson, James M.; Rooks, James B.; and Yeshaya, Amalia, 4,589,420, Cl. 128-702.000.
Carrier Corporation: *See—*
Greever, James E.; and Gray, Kenneth P., 4,589,198, Cl. 29-709.000.
Carroll, William G.: *See—*
Brown, James P.; Carroll, William G.; May, Ronald N.; Merckx, Erik M. B.; and Sparrow, David J., 4,590,226, Cl. 521-174.000.
Carson, Charles A.: *See—*
Buening, Gerald M.; and Carson, Charles A., 4,590,072, Cl. 424-93.000.
Carson, Forrest L.: *See—*
Rives, Joe F.; and Carson, Forrest L., 4,589,566, Cl. 220-316.000.
Carter, Garry L., to Medical Engineering Corporation. Fluid flow meter utilizing pressure sensing. 4,589,280, Cl. 73-226.000.
Carter, John P., Jr.; and Wolgemuth, Richard L., to Adria Laboratories, Inc. Anticonvulsants. 4,590,063, Cl. 424-19.000.
Cartmell, James V., to NDM Corporation. Medical electrodes and dispensing conditioner therefor. 4,590,089, Cl. 427-2.000.
Cartwright, David, to Imperial Chemical Industries PLC. Herbicidal compounds. 4,589,914, Cl. 71-103.000.
Carver, David; and Tait, Thomas A., to Chiratech, Inc. Method and apparatus for measuring optical properties of materials. 4,589,776, Cl. 356-367.000.
Casacci, Severin: *See—*
Rondot, Jack; and Casacci, Severin, 4,589,821, Cl. 415-111.000.
Case, Allen W., Jr.: *See—*
Povlick, Thomas P.; and Case, Allen W., Jr., 4,590,356, Cl. 219-124.340.
Case, Steven K.: *See—*
Barath, James D.; and Case, Steven K., 4,589,404, Cl. 128-6.000.
Casey, James E., to Kelly Services, Inc. Dexterity evaluation apparatus. 4,589,849, Cl. 434-258.000.
Casper, Robert A.: *See—*
Dunn, Richard L.; Terry, Richard N.; Cowsar, Donald R.; and Casper, Robert A., 4,589,880, Cl. 604-892.000.
Cassat, Robert, to Rhone-Poulenc Specialites Chimiques. Metallizing of plastic substrata. 4,590,115, Cl. 428-174.000.
Cassidy, Robert T.: *See—*
Hiscock, Willis E.; Cassidy, Robert T.; and Werner, Robert G., 4,589,888, Cl. 55-26.000.
Catana, Marin: *See—*
Apetrei, Constantin; Slaifer, Sigismund; Vatafu-Gaitan, Laurentiu; Stefanescu, Dumitru; Marinescu, Stelian; and Catana, Marin, 4,589,534, Cl. 192-18.00B.
Caterpillar Tractor Co.: *See—*
Hulting, Thomas S., Jr., 4,589,179, Cl. 29-256.000.
Peifer, Gary S.; and Russell, Charles R., 4,589,639, Cl. 267-150.000.
Vachon, Louis F., 4,589,180, Cl. 29-263.000.
Cates, Medwin A. Boat and car trailer. 4,589,814, Cl. 414-484.000.
Caullet, Bernard: *See—*
Edelbruck, Pierre; Melzac, Georges; and Caullet, Bernard, 4,589,554, Cl. 209-546.000.
Cavagnino, Pietro. Label grasping and transferring device in a labelling machine for bottles and the like. 4,589,949, Cl. 156-568.000.
Cavazza, Claudio; De Witt, Paolo; Tinti, Maria O.; and Quaresima, Emma, to Sigma-Tau Industrie Farmaceutiche Riunite S.p.A. Alkoxy-acyl carnitines and pharmaceutical compositions containing same. 4,590,209, Cl. 514-547.000.
Cave, David L.; and Bynum, Byron G., to Motorola Inc. Compensation circuit and method for stabilization of a circuit node by multiplication of displacement current. 4,590,389, Cl. 307-303.000.
Cawlfield, David W., to Olin Corporation. Process for producing high purity solutions of alkali metal hydrosulfites. 4,590,058, Cl. 423-515.000.
Caye, Paul D.; Jamain, Patrice C.; and Weisser, Bernard G., to Societe Nationale Industrielle Aerospatiale. Kinetic wheel arrangement incorporating magnetic bearings, particularly intended to serve as energy accumulator. 4,589,707, Cl. 308-10.000.
Celanese Corporation: *See—*
Che, Tessie M., 4,590,298, Cl. 568-387.000.
Celltech Limited: *See—*
Kenney, Andrew C., 4,589,987, Cl. 210-725.000.
Cementation Company of America, Incorporated: *See—*
Salter, Martin de G.; and Hynd, John G. S., 4,589,502, Cl. 175-102.000.
Central Glass Company, Limited: *See—*
Kita, Yasushi; Nakano, Hisaji; Moroi, Shiro; and Sakanoue, Akira, 4,590,316, Cl. 570-150.000.
Centre National de la Recherche Scientifique: *See—*
Chevalet, Jean; and Reeves, Robert, 4,590,609, Cl. 382-50.000.
Centrifugal Piston Expander, Inc.: *See—*
Schaich, Wilbur A., 4,589,257, Cl. 60-670.000.
Chabala, John C.: *See—*
Bochis, Richard J.; Chabala, John C.; and Fisher, Michael H., 4,590,201, Cl. 514-359.000.
Champion International Corporation: *See—*
Kelley, Robert G., 4,589,454, Cl. 141-68.000.
Champion Road Machinery Limited: *See—*
Jerry, James H.; and VanderEyk, Garry J., 4,589,295, Cl. 74-360.000.
Chandler, Howard M.; Healey, Kevin; and Hurrell, John G. R., to Commonwealth Serum Laboratories Commission. Method for detecting antigens and antibodies. 4,590,157, Cl. 435-7.000.
Chandley, George D.; and Thomas, Eugene W., to Hitchiner Manufacturing Co., Inc. Metal casting. 4,589,466, Cl. 164-119.000.
Chang, Clarence D.; and Miale, Joseph N., to Mobil Oil Corporation. Synthesis of crystalline aluminum phosphates with a urea templating agent. 4,590,050, Cl. 423-305.000.
Chang, Wen-Hsuan; McKeough, David T.; and Chau, Michael M., to PPG Industries, Inc. Non-aqueous poly(urethane-urea). 4,590,254, Cl. 528-49.000.
Chang, Yi M.; and Fenwick, James R., to Rockwell International Corporation. Controllable fluid damper for fluid-containing tank. 4,589,526, Cl. 188-74.000.
Chantler, Eric N.; Hutchinson, Francis G.; and Sharman, Deborah A., to Imperial Chemical Industries PLC. Contraceptive methods. 4,590,070, Cl. 424-78.000.
Chapet, Marc, to CLEXTRAL. Multi-lobe composite casing for a multi-screw processing machine. 4,590,033, Cl. 419-9.000.
Charette, Marc F.: *See—*
Markovitz, Alvin; Zehnbauer, Barbara A.; Schoemaker, Joyce M.; and Charette, Marc F., 4,590,159, Cl. 435-68.000.
Charles of the Ritz Group Ltd.: *See—*
Deckner, George E.; O'Grady, Hedwig; and Zofchak, Albert, 4,590,069, Cl. 424-70.000.
Charleswater Products, Inc.: *See—*
Berbeco, George R., 4,589,954, Cl. 162-138.000.
Chasar, Dwight W., to B. F. Goodrich Company, The. 2,4-bis-(2,6-di-t-alkyl-4-substituted-phenoxy)-1,3,2,4-dioxadiphosphetanes. 4,590,017, Cl. 558-73.000.
Chase, Phil. Wheel pushing device. 4,589,509, Cl. 180-74.000.
Chase, Vance A.: *See—*
Olster, Elliot F.; and Chase, Vance A., 4,589,564, Cl. 220-3.000.
Chastain, Charles E.; and King, Donald R., to PRM Energy Systems, Inc. Particulate waste product combustion system. 4,589,355, Cl. 110-346.000.
Chatburn, Robert L.; and Lough, Marvin D. Heat and humidification system for high frequency jet ventilation. 4,589,409, Cl. 128-203.260.
Chatman, William L.: *See—*
Oakley, C. Mitchell, Jr.; and Chatman, William L., 4,589,266, Cl. 66-12.000.
Chau, Michael M.: *See—*
Chang, Wen-Hsuan; McKeough, David T.; and Chau, Michael M., 4,590,254, Cl. 528-49.000.
Chauvin Arnoux: *See—*
Arnoux, Daniel; Bousquet, Jean; and Genter, Claude, 4,590,421, Cl. 324-62.000.
Che, Tessie M., to Celanese Corporation. Production of hydroxyketones from formaldehyde. 4,590,298, Cl. 568-387.000.
Chen, Grand, to Silver River Electronic Co., Ltd. Trilight. 4,590,543, Cl. 362-183.000.

Chen, Michael S. K.; Goff, Stephen P.; and VanOmmeren, James, to Air Products and Chemicals, Inc. Process for separating CO_2 and H_2S from hydrocarbons. 4,589,896, Cl. 62-28.000.
Chen, Pi-Fuay; Seemuller, William W.; and Rohde, Frederick W., to United States of America, Army. Topographic feature extraction using sensor array system. 4,590,608, Cl. 382-43.000.
Chen, Wenjai R.; and Savage, Robert L., to Ohio University. Method of making carbon black having low ash content from carbonaceous materials. 4,590,056, Cl. 423-449.000.
Cheng, Paul J., to Phillips Petroleum Company. Auto-preseparation of carbon black. 4,590,039, Cl. 422-150.000.
Cherukuri, Subraman R.: *See*—
Wei, You C.; Cherukuri, Subraman R.; Hriscisce, Frank; Piccolo, Dominic J.; and Bilka, Kenneth P., 4,590,075, Cl. 426-5.000.
Chevalet, Jean; and Reeves, Robert, to Centre National de la Recherche Scientifique. System for the acquisition of data inscribed on a support. 4,590,609, Cl. 382-50.000.
Chevalier, Pierre. Package comprising a strip and side flaps. 4,589,552, Cl. 206-492.000.
Chevallier, Yvonick; and Morawski, Jean-Claude, to Rhone-Poulenc Chimie de Base. Precipitated silica having improved morphological characteristics and process for the production thereof. 4,590,052, Cl. 423-335.000.
Chevron Research Company: *See*—
Zones, Stacey I., 4,589,976, Cl. 208-111.000.
Zones, Stacey I., 4,589,977, Cl. 208-111.000.
Chiba, Hiroshi: *See*—
Kokubo, Eiichi; Goi, Koichi; Arikawa, Junichi; Ebihara, Hideyuki; and Chiba, Hiroshi, 4,589,708, Cl. 312-71.000.
Chicoye, Etzer: *See*—
Cowles, John M.; Goldstein, Henry; Chicoye, Etzer; and Ting, Patrick L., 4,590,296, Cl. 568-366.000.
Chikura, Shinichi: *See*—
Kazuse, Yoshitaka; Iwama, Akio; and Chikura, Shinichi, 4,590,098, Cl. 427-244.000.
Children's Medical Center Corporation, The: *See*—
Sytkowski, Arthur J.; and Sue, Julia M., 4,590,168, Cl. 436-518.000.
Chinon Kabushiki Kaisha: *See*—
Nakayama, Yasuhiko; Takami, Fumio; and Shigeno, Masashi, 4,589,747, Cl. 354-149.110.
Chiratech, Inc.: *See*—
Carver, David; and Tait, Thomas A., 4,589,776, Cl. 356-367.000.
Chisso Corporation: *See*—
Inoue, Hiromichi; Saito, Shinichi; Terashima, Kanetsugu; Inukai, Takashi; and Furukawa, Kenji, 4,589,996, Cl. 252-299.650.
Iwasaki, Masamitsu; Suzuki, Takeshi; Koizumi, Takashi; Takahashi, Takehiko; Shibata, Kazumasa; Komori, Nobutoshi; and Shimizu, Atsuyoshi, 4,589,215, Cl. 34-182.000.
Chivens, Donald R.: *See*—
Greskovics, Paul; and Chivens, Donald R., 4,589,986, Cl. 210-483.000.
Choe, Jangil. Cigarette package. 4,589,545, Cl. 206-264.000.
Christiansen, Robert A.; Rose, Frank M., Jr.; Smith, James R.; and Woosley, Kenneth D., to International Business Machines Corporation. Electrical connection for polymeric conductive material. 4,589,584, Cl. 228-110.000.
Chu, Chin-Chiun, to Mobil Oil Corporation. Aromatization reactions with zeolites containing phosphorus oxide. 4,590,321, Cl. 585-415.000.
Chu, Chin-Chiun, to Mobil Oil Corporation. Use of hydrogen sulfide to improve benzene production over zeolites. 4,590,322, Cl. 585-415.000.
Chu, Chin-Chiun, to Mobil Oil Corporation. Conversion of paraffins to aromatics over zeolites modified with oxides of group IIIA, IVA and VA elements. 4,590,323, Cl. 585-417.000.
Chugai Seiyaku Kabushiki Kaisha: *See*—
Sugiyama, Hiroshi; Hosoda, Keizo; Okada, Masanori; Iwane, Yoshitaka; and Murakami, Yasushi, 4,590,198, Cl. 514-336.000.
Chyung, Kenneth: *See*—
Brennan, John J.; Chyung, Kenneth; and Taylor, Mark P., 4,589,900, Cl. 65-33.000.
Ciba-Geigy Corporation: *See*—
Blackwell, Joseph T.; Daughety, Harold L.; Grace, Henry C.; and Oliver, Ward H., 4,590,292, Cl. 560-124.000.
Ehrenfreund, Josef; and Fory, Werner, 4,589,911, Cl. 71-91.000.
Karrer, Friedrich, 4,590,268, Cl. 544-121.000.
Kaschig, Jurgen; Kleiner, Eduard K.; Mueller, Karl F.; and Cooke, Thomas W., 4,590,129, Cl. 428-425.100.
Phillips, Emyr; and Wilson, David, 4,589,992, Cl. 252-75.000.
Riediker, Martin; Roth, Martin; Buhler, Niklaus; and Berger, Joseph, 4,590,287, Cl. 556-53.000.
Seltzer, Raymond; Patel, Ambelal R.; Stewart, Peter W.; and White, Charlene, 4,590,231, Cl. 524-100.000.
Thummel, Rudolph C.; and Fory, Werner, 4,589,912, Cl. 71-93.000.
Cioca, Gheorge; Feeley, George F.; Brabson, Joseph B.; and Barth, Peter, to Seton Company. Method of forming a moisture permeable polymeric sheet material. 4,590,022, Cl. 264-41.000.
Cipriano, Robert A.; and Ezzell, Bobby R., to Dow Chemical Company, The. Process for the conversion of salts of carboxylic acid to their corresponding free acids. 4,589,963, Cl. 204-72.000.
Citizen Watch Co., Ltd.: *See*—
Nikaido, Akira; Machida, Takayasu; Hirosawa, Yasuhisa; and Nakajima, Fumio, 4,590,529, Cl. 360-106.000.
Citrin, Paul S.; and Murcko, Nelson F., to Indicon, Inc. Incremental actuator for syringe. 4,589,870, Cl. 604-210.000.
Cittrich, Jurgen: *See*—
Duerwald, Dierk; and Cittrich, Jurgen, 4,589,510, Cl. 180-140.000.
Clanet, Frank. Method and device for filling an aerosol can with two compartments. 4,589,452, Cl. 141-3.000.
Clark, Charles J.; and Bennett, Edward M., to Rockwood Systems Corporation. Method for explosive blast control using expanded foam. 4,589,341, Cl. 102-303.000.
Clausen, Earl W.; and Hubbard, Lloyd C., to MICI Limited Partnership IV. Centrifugal blood pump with impeller. 4,589,822, Cl. 415-170.00A.
Clawson, Burrell E. Press control system. 4,589,830, Cl. 425-150.000.
Clean-Tex A/S: *See*—
Lang, Aage, 4,589,316, Cl. 83-289.000.
Clegg, John E. Universal revolving microscope stage. 4,589,741, Cl. 350-532.000.
Clegg, John E. Circular microscope specimen slide. 4,589,743, Cl. 350-536.000.
Clement, Kenward J. Wire rope salvaging apparatus. 4,589,315, Cl. 83-202.000.
Clements, Jack D., to Solo Cup Company. Lid for drinking cup. 4,589,569, Cl. 220-380.000.
Clemons, Donald G.; and DePaolis, Michael V., Jr., to AT&T Bell Laboratories. CMOS spare decoder circuit. 4,590,388, Cl. 307-202.100.
Cleveland, William K. S.; Ryer, Jack; and Deen, Harold E., to Exxon Research & Engineering Co. Power transmission shift fluids containing two-component friction modifier additive. 4,589,993, Cl. 252-78.500.
CLEXTRAL: *See*—
Chapet, Marc, 4,590,033, Cl. 419-9.000.
Cline, Harvey E., to General Electric Company. Solid state zone recrystallization of semiconductor material on an insulator. 4,590,130, Cl. 428-446.000.
Coad, George L., to Avalon Research. Cyclic dwell engine. 4,589,380, Cl. 123-46.00R.
Cocco, Vincent L.: *See*—
Norris, Philip R.; and Cocco, Vincent L., 4,589,752, Cl. 354-303.000.
Cocuzza, Anthony J., to Du Pont de Nemours, E. I., and Company. Antihypertensive 1-[bis-(substituted phenyl)methyl]-4[2-(1,2,3,4-tetrahydro-substituted naphthalen-1-ylidene)ethyl]piperazines. 4,590,274, Cl. 544-396.000.
Codenoll Technology Corporation: *See*—
Scholl, Frederick W., 4,590,501, Cl. 357-17.000.
Coker, Geoffrey G.; and Findlay, John W. A. Antihistaminic 2-(amino ethylamino) pyridines. 4,590,199, Cl. 514-343.000.
Colacello, Michael A.; Fitzke, Emil V.; and Otto, Jack F., to RCA Corporation. Apparatus for sealing a mount in a cathode-ray tube. 4,589,902, Cl. 65-252.000.
Cole, Paul M., to Du Pont de Nemours, E. I., and Company. Centrifuge rotor having a resilient trunnion. 4,589,864, Cl. 494-20.000.
Coleman Company, Inc., The: *See*—
Milliman, Keith, 4,589,219, Cl. 42-73.000.
Colford, Terence H.; and Harrison, Reginald, to Dunlop Limited. Elastomeric mountings. 4,589,347, Cl. 105-224.100.
Colgate-Palmolive Company: *See*—
Gaffar, Abdul, 4,590,064, Cl. 424-49.000.
Piechota, Stanley E., Jr.; and Sparacio, Dorinda A., 4,590,065, Cl. 424-49.000.
Coller, John H., to D. G. Shelter Products Company. Insect barrier means for sliding door constructions. 4,589,464, Cl. 160-91.000.
Collette, Dorothy A. Wire mat turf protector. 4,589,224, Cl. 47-1.00R.
Collins, Billy; and Collins, James F. Flexographic plate mounting apparatus and method. 4,589,338, Cl. 101-216.000.
Collins, Hans-Jurgen; and Lhotzky, Kurt. Process and apparatus for determining the percentage of a liquid contained in a liquid mixture. 4,589,277, Cl. 73-61.10R.
Collins, James F.: *See*—
Collins, Billy; and Collins, James F., 4,589,338, Cl. 101-216.000.
Combustion Engineering, Inc.: *See*—
Bauver, Wesley P., II, 4,589,353, Cl. 110-244.000.
Commissariat a l'Energie Atomique: *See*—
Artaud, Robert; Aubert, Michel; and Renaux, Charley, 4,589,375, Cl. 122-504.000.
Commonwealth of Puerto Rico: *See*—
Cox, Osvaldo; and Baez, Adriana, 4,590,275, Cl. 546-62.000.
Commonwealth Serum Laboratories Commission: *See*—
Chandler, Howard M.; Healey, Kevin; and Hurrell, John G. R., 4,590,157, Cl. 435-7.000.
Communications Technology Corp.: *See*—
Ray, Jimmy C.; and Mathews, H. Wayne, 4,590,336, Cl. 179-175.30A.
Compagnie Europeenne pour l'Equipement Menager "Cepem" : *See*—
Maitenaz, Paul; and Gernez, Alain, 4,590,360, Cl. 219-390.000.
Compagnie Industrielle des Lasers Cilas Alcatel: *See*—
Rovati, Philippe; Jourdain, Claude; and de Witte, Olivier, 4,590,375, Cl. 250-348.000.
Compagnie Internationale pour l'Informatique Cii-Honeywell Bull (Societe Anonyme): *See*—
Bourrez, Jean-Marie, 4,590,555, Cl. 364-200.000.
Compagnie ORIS Industrie S.A.: *See*—
Berthet, Jeanne; Blin, Marie-Francoise; and Gaussens, Gilbert, 4,590,068, Cl. 424-81.000.
Condea Chemie GmbH: *See*—
Albert, Gert; Kamps, Manfred; Noweck, Klaus; Reichenauer, Ansgar; Scherf, Erich; and Ziegler, Udo, 4,590,289, Cl. 556-188.000.

Conoco Inc.: *See*—
Darr, Carey D. K.; and Brown, Eric K., 4,589,490, Cl. 166-276.000.
Salama, Mamdouh M., 4,589,801, Cl. 405-224.000.

Cooke, Thomas W.: *See*—
Kaschig, Jurgen; Kleiner, Eduard K.; Mueller, Karl F.; and Cooke, Thomas W., 4,590,129, Cl. 428-425.100.

Cooper, Lawrence: *See*—
Shukla, Vishwa; Padovani, Francois A.; and Cooper, Lawrence, 4,590,400, Cl. 310-338.000.

Cooper, Michael N., to Knogo Corporation. Tamper resistant target wafer and fastener assembly. 4,590,461, Cl. 340-572.000.

Corbet, Jean-Pierre; Cotrel, Claude; Farge, Daniel; and Paris, Jean-Marc, to Rhone-Poulenc Sante. Pristinamycin derivatives, their preparation and their use. 4,590,004, Cl. 530-317.000.

Corbin, John S., Jr.; Polk, Darryl R.; and Ramirez, Ciro N., to International Business Machines Corporation. Method and apparatus for controlling escapement. 4,589,790, Cl. 400-322.000.

Cordier, Georges, to Rhone-Poulenc Specialites Chimiques. Process for the preparation of perfluoroalkanols. 4,590,309, Cl. 568-842.000.

Cordis Europa N.V.: *See*—
Ligtenberg, Hendrikus C. G.; and Veld, Albertus, 4,589,970, Cl. 204-406.000.

Corning Glass Works: *See*—
Nigrin, Jaroslava M., 4,590,171, Cl. 501-25.000.

Coronet-Werke Heinrich Schlerf GmbH: *See*—
Weihrauch, Georg, 4,589,791, Cl. 401-290.000.

Costello, Alan T.; and Milner, David J., to Imperial Chemical Industries PLC. Selective halogenation of benzene di and tri-methanol compounds. 4,590,308, Cl. 568-812.000.

Cotrel, Claude: *See*—
Corbet, Jean-Pierre; Cotrel, Claude; Farge, Daniel; and Paris, Jean-Marc, 4,590,004, Cl. 530-317.000.

Cotterill, Lee A.: *See*—
Rehklau, George D.; Cotterill, Lee A.; and Langevin, Robert Z., 4,589,608, Cl. 242-195.000.

Couch, Robert P.: *See*—
Zwicke, Philip E.; Rosenbush, David M.; and Couch, Robert P., 4,590,562, Cl. 364-431.020.

Courtesy Mold & Tool Corporation: *See*—
Vogel, Allen J., 4,589,204, Cl. 30-324.000.

Cowles, John M.; Goldstein, Henry; Chicoye, Etzer; and Ting, Patrick L., to Miller Brewing Company. Process for separation of beta-acids from extract containing alpha-acids and beta-acids. 4,590,296, Cl. 568-366.000.

Cowsar, Donald R.: *See*—
Dunn, Richard L.; Terry, Richard N.; Cowsar, Donald R.; and Casper, Robert A., 4,589,880, Cl. 604-892.000.

Cox, Osvaldo; and Baez, Adriana, to Commonwealth of Puerto Rico. Benzoheterazolo[3,2-a]quinolinium salts. 4,590,275, Cl. 546-62.000.

Craft, Jack, to RCA Corporation. Odd harmonic signal generator. 4,590,513, Cl. 358-31.000.

Cragle, Linda K.; Harris, Paul C.; Lee, Shih-Yun; Tung, Ker-Kong; and Vodian, Morton A., to Beckman Instruments, Inc. Direct particle agglutination immunoassays avoiding false negatives at high antigen concentrations. 4,590,169, Cl. 436-523.000.

Crano, John C.: *See*—
Tang, Robert H.; and Crano, John C., 4,590,008, Cl. 558-264.000.

Cray Research, Inc.: *See*—
Cray, Seymour R., Jr., 4,590,538, Cl. 361-385.000.

Cray, Seymour R., Jr., to Cray Research, Inc. Immersion cooled high density electronic assembly. 4,590,538, Cl. 361-385.000.

Crea, Dominic: *See*—
Nath, Prem; Barnard, Timothy J.; and Crea, Dominic, 4,590,327, Cl. 136-256.000.

Creusot-Loire: *See*—
Fournier, Yves, 4,589,618, Cl. 248-68.100.

Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Prat, Gisele; and Pontagnier, Henri, to Societe Cortial, S.A. 3-(2-(4-phenylpiperazinylethyl)anilino)-isobenzofuranones, their method of preparation and their use as antihypertensive and antiallergic drugs. 4,590,193, Cl. 514-253.000.

Crisci, Clem C., to Northern Engineering and Plastics Corp. Tamperproof closure for containers. 4,589,561, Cl. 215-256.000.

Cross, Peter E.; and Dickinson, Roger P., to Pfizer Inc. Naphthalene thromboxane synthetase inhibitors. 4,590,200, Cl. 514-357.000.

Cross, Peter E.: *See*—
Alker, David; Cross, Peter E.; and Campbell, Simon F., 4,590,195, Cl. 514-252.000.

Crumbach, Richard: *See*—
Gillner, Manfred; Friedrich, Hans G.; Grau, Christian; Crumbach, Richard; Scholl, Heinz; and Hiemenz, Christian, 4,590,030, Cl. 264-331.190.

Cuisinarts, Inc.: *See*—
Williams, James E., 4,589,599, Cl. 241-37.500.

Cummings, Kenneth D.; Gould, Donald R.; Gray, Forrest C.; and Pereira, Lawrence W., to International Business Machines. Character generator for raster printer. 4,590,585, Cl. 364-900.000.

Cummings, Peter A. Skylight assembly. 4,589,239, Cl. 52-200.000.

Cuprinol Limited: *See*—
Hilditch, Edward A.; Hambling, Robert E.; Sparks, Colin R.; and Walker, David A., 4,590,208, Cl. 514-500.000.

Curran, Barry D., to Morgan Corporation. On board scale devices. 4,589,507, Cl. 177-138.000.

D.A.B. Industries: *See*—
Lloyd, Kenneth, 4,590,133, Cl. 428-653.000.

D. G. Shelter Products Company: *See*—
Coller, John H., 4,589,464, Cl. 160-91.000.

Dadkar, Nandkumar K.: *See*—
Lal, Bansi; Dohadwalla, Alihussein N.; Aroskar, Vijay A.; Dadkar, Nandkumar K.; Dornauer, Horst; Mascarenhas, Julius; and deSouza, Noel J., 4,590,197, Cl. 514-267.000.

Dahlgren, Arthur J., to Alfa-Laval AB. Plate heat exchanger. 4,589,480, Cl. 165-146.000.

Dahowski, Donald E., to Quaker Plastic Corporation. Stair module support and leveling construction. 4,589,237, Cl. 52-169.700.

Daicel Chemical Industries, Ltd.: *See*—
Furomoto, Mitsuru; and Asano, Toshio, 4,590,238, Cl. 524-745.000.
Itoh, Masanori; Takenaka, Fumio; and Tohya, Kouzi, 4,590,145, Cl. 430-281.000.
Yamashita, Mitsuru; and Shima, Kouji, 4,590,266, Cl. 536-69.000.

Daido Tokushuko Kabushiki Kaisha: *See*—
Sasayama, Shinichi, 4,589,916, Cl. 75-126.00R.

Daikin Industries, Ltd.: *See*—
Ohashi, Ryutaro; Hasegawa, Hisashi; Miyoshi, Masao; Iida, Hajime; Mase, Toshiyuki; Tanaka, Takashi; Funatsu, Tsunemasa; and Nakanishi, Tami, 4,589,261, Cl. 62-73.000.

Daimer, Wolfgang; Gmoser, Johann; and Schipfer, Rudolf, to Vianova Kunstharz, A.G. Self-crosslinking cathodically depositable ed-binders containing modified alkylphenyl-formaldehyde condensation products. 4,590,245, Cl. 525-504.000.

Daimler-Benz Aktiengesellschaft: *See*—
Braun, Dieter; and Mehren, Herbert, 4,589,675, Cl. 280-707.000.

Dainippon Ink and Chemicals, Inc.: *See*—
Nishihashi, Hideji; Matsubayashi, Tadao; Katabami, Tadashi; and Matsuda, Ken-ichi, 4,590,160, Cl. 435-78.000.

Dalton, John V.; Orlowsky, Kenneth J.; and Sinha, Ashok K., to AT&T Bell Laboratories. Method of making semiconductor integrated circuits having backside gettered with phosphorus. 4,589,928, Cl. 148-1.500.

Daluge, Susan M.; Skonezny, Paul M.; Roth, Barbara; and Rauckman, Barbara S., to Burroughs Wellcome Co. 2,4-diamino-5-(substituted)-pyrimidines, useful as antimicrobials. 4,590,271, Cl. 544-324.000.

D'Amato, Ralph J., to RCA Corporation. Method and apparatus for screening line screen slit mask color picture tubes. 4,590,137, Cl. 430-24.000.

D'Amato, Ralph J., to RCA Corporation. Cathode-ray tube having a faceplate with decreasing center-to-edge thickness. 4,590,404, Cl. 313-477.00R.

Danielsson, Mats, to Santrade Ltd. Saw and method for the manufacture thereof. 4,589,306, Cl. 76-112.000.

Danley, Allen M.: *See*—
Pomroy, James F.; and Danley, Allen M., 4,590,351, Cl. 219-10.55F.

Danne, Ulrich W.; and Heibel, Helmut, to Lucas Industries public limited company. Automatic adjusting device for a brake. 4,589,527, Cl. 188-79.5GE.

Darr, Carey D. K.; and Brown, Eric K., to Conoco Inc. Well bore recompletion. 4,589,490, Cl. 166-276.000.

Das, Ranendu M.: *See*—
Harari, Eliyahou; and Das, Ranendu M., 4,590,503, Cl. 357-23.500.

Datox Organisation D. Schweinsberg GmbH & Co. KG: *See*—
Schweinsberg, Dieter, 4,589,544, Cl. 206-45.000.

Daughety, Harold L.: *See*—
Blackwell, Joseph T.; Daughety, Harold L.; Grace, Henry C.; and Oliver, Ward H., 4,590,292, Cl. 560-124.000.

Davidowich, George: *See*—
Rosamilia, Peter L.; and Davidowich, George, 4,590,102, Cl. 427-374.100.

Davidson, Robert I.: *See*—
Ramachandran, Venkataraman; Davidson, Robert I.; and Maloney, John R., 4,590,010, Cl. 558-341.000.

Davis, Newton G.: *See*—
Burgit, Richard A.; Davis, Newton G.; Goyert, Josita M.; Johnson, Keith, Jr.; Long, Robert A.; and Stachura, Joseph F., 4,589,200, Cl. 29-753.000.

Davis, Randall D., to Sundstrand Corporation. Terminal block for dynamoelectric machine. 4,590,397, Cl. 310-71.000.

Davison, Fred E. Monorail conveyance system for wind or water powered generator apparatus. 4,589,344, Cl. 104-24.000.

Day, David R.; and McElrcy, Lucian G. Apparatus for stripping fluids including dimensionally stable and substantially rigid bag. 4,589,160, Cl. 15-316.00R.

Debrodt, Heiner: *See*—
Preisler, Eberhard; Debrodt, Heiner; and Lieberoth, Dieter, 4,589,960, Cl. 204-37.100.

Decandia, Giovanni, to FL Industries, Inc. Lighting fixture with conduit adaptable wire cover. 4,590,544, Cl. 362-368.000.

Decker, Victor D.: *See*—
Pfuhl, Paul H.; Morrison, Charles E.; and Decker, Victor D., 4,589,713, Cl. 339-7.000.

Deckner, George E.; O'Grady, Hedwig; and Zofchak, Albert, to Charles of the Ritz Group Ltd. Novel substantive moisturizing derivatives of 2-pyrrolidone-5-carboxylic acid and compositions containing same. 4,590,069, Cl. 424-70.000.

Dedert Corporation: *See*—
Gronvaldt, Jesper, 4,589,890, Cl. 55-59.000.

Deen, Harold E.: *See*—
Cleveland, William K. S.; Ryer, Jack; and Deen, Harold E., 4,589,993, Cl. 252-78.500.

Degussa Aktiengesellschaft: *See*—
Drauz, Karlheinz; and Kleemann, Axel, 4,590,305, Cl. 568-771.000.

Gunther, Kurt; Martens, Jurgen; and Schickedanz, Maren, 4,590,167, Cl. 436-162.000.
Kula, Maria-Regina; Hummel, Werner; Schutte, Horst; and Leuchtenberger, Wolfgang, 4,590,161, Cl. 435-108.000.
Muller, Karl-Hans; and Diehl, Manfred, 4,589,989, Cl. 252-8.750.

Deibler, Melvin E.: *See—*
Harrigan, Michael E.; Rees, James D.; and Deibler, Melvin E., 4,589,736, Cl. 350-413.000.

Delbuck, Pascal. Phase coherent low frequency speaker. 4,590,332, Cl. 179-115.5PS.

Del Duca, Matteo E. Clutch and brake assembly. 4,589,533, Cl. 192-18.00A.

Del Fabbro, Claudio, to Zanussi Grandi Impianti S.p.A. Food frying apparatus including indirect oil heater. 4,590,361, Cl. 219-439.000.

Delhaye, Jean-Noel; and Kielczewska, Elizabeth. Process and apparatus for sampling ambient air at a work place. 4,589,292, Cl. 73-863.030.

De Luca, Paul V.; and Hung, Peter, to Porta Systems Corp. Test shoe for telephone connector blocks having module retraction means. 4,590,335, Cl. 179-175.000.

del Valle, Jorge L., to Electrolux Corporation. Flexible helically wound hose with hinged strip. 4,589,448, Cl. 138-122.000.

Demers, Kenneth P.: *See—*
Barto, John J., Jr.; Walsh, Peter M.; Fitzpatrick, Peter R.; Dondero, Richard F.; Demers, Kenneth P.; and Gardner, Stephen M., 4,590,578, Cl. 364-513.000.

Denda, Masahiko: *See—*
Tsubouchi, Natsuro; and Denda, Masahiko, 4,589,189, Cl. 29-571.000.

Denny, William A.: *See—*
Atwell, Graham J.; Baguley, Bruce C.; Denny, William A.; and Rewcastle, Gordon W., 4,590,277, Cl. 546-105.000.

DePaolis, Michael V., Jr.: *See—*
Clemons, Donald G.; and DePaolis, Michael V., Jr., 4,590,388, Cl. 307-202.100.

De Schamphelaere, Lucien A.; Librecht, Freddy M.; and Verlinden, Willy G., to Agfa-Gevaert N.V. Toner dispensing control. 4,589,762, Cl. 355-14.00D.

Desjarlais, Robert C.; and Bennett, Everett W., to James River Graphics, Inc. High speed diazonium salts useful in diazo type photoreproduction. 4,590,263, Cl. 534-558.000.

DeSoto, Inc.: *See—*
Ansel, Robert E., 4,590,250, Cl. 526-301.000.

deSouza, Noel J.: *See—*
Lal, Bansi; Dohadwalla, Alihussein N.; Aroskar, Vijay A.; Dadkar, Nandkumar K.; Dornauer, Horst; Mascarenhas, Julius; and deSouza, Noel J., 4,590,197, Cl. 514-267.000.

Deu, Herbert: *See—*
Pampouchidis, Georg; and Deu, Herbert, 4,590,009, Cl. 560-332.000.

Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V.: *See—*
Heindl, Johann; and Hirzinger, Gerhard, 4,589,810, Cl. 414-5.000.

Deutsche Thomson-Brandt GmbH: *See—*
Maier, Gerhard; and Lange, Joachim, 4,590,611, Cl. 455-166.000.

Development Finance Corporation of New Zealand: *See—*
Atwell, Graham J.; Baguley, Bruce C.; Denny, William A.; and Rewcastle, Gordon W., 4,590,277, Cl. 546-105.000.

De Witt, Paolo: *See—*
Cavazza, Claudio; De Witt, Paolo; Tinti, Maria O.; and Quaresima, Emma, 4,590,209, Cl. 514-547.000.

de Witte, Olivier: *See—*
Rovati, Philippe; Jourdain, Claude; and de Witte, Olivier, 4,590,375, Cl. 250-348.000.

Diamant Boart Societe Anonyme: *See—*
Simpson, Neil A. A., 4,589,504, Cl. 175-267.000.

di Borgoricco, Eugenio S., to AT&T Bell Laboratories. Constant-percent break pulse corrector. 4,590,432, Cl. 328-164.000.

Dic Fine Chemicals, Inc.: *See—*
Nishihashi, Hideji; Matsubayashi, Tadao; Katabami, Tadashi; and Matsuda, Ken-ichi, 4,590,160, Cl. 435-78.000.

DiCarlo, Leonard J.; Ares, Roland A.; and Norton, Robert O., to Hussmann Corporation. Multiple compressor oil system. 4,589,263, Cl. 62-193.000.

Dickens, Duane D., to American Hospital Supply Corporation. Strain gauge for medical pressure measurements. 4,589,287, Cl. 73-727.000.

Dickens, John R., to Scottorn Trailers Limited. Improvement in or relating to trailers. 4,589,672, Cl. 280-478.00B.

Dickinson, Roger P.: *See—*
Cross, Peter E.; and Dickinson, Roger P., 4,590,200, Cl. 514-357.000.

Dickinson, William B.: *See—*
Lesher, George Y.; and Dickinson, William B., 4,590,194, Cl. 514-247.000.

Dideriksen, Erling T.: *See—*
Bach, Erik; and Dideriksen, Erling T., 4,589,702, Cl. 301-63.0PW.

Diehl, Manfred: *See—*
Muller, Karl-Hans; and Diehl, Manfred, 4,589,989, Cl. 252-8.750.

Diesel Kiki Co., Ltd.: *See—*
Ito, Satoru, 4,589,394, Cl. 123-502.000.
Nozawa, Kazuo, 4,589,265, Cl. 62-526.000.

Dilling, Peter, to Westvaco Corporation. Low electrolyte sodium lignosulfonates. 4,590,262, Cl. 530-500.000.

Dimier, Jean-Pierre; and Pascal, Roger, to Salomon S.A. Release mechanism for a ski binding. 4,589,673, Cl. 280-630.000.

Dinan, John H.; and Gutierrez, William A., to United States of America, Army. Hybrid epitaxial growth process. 4,589,192, Cl. 29-572.000.

Dinkel, Emil: *See—*
Mann, Bernd; Schneyer, Gerhard; and Dinkel, Emil, 4,589,297, Cl. 74-427.000.

Director-General of the Agency of Industrial Science and Technology: *See—*
Yamada, Yasuhiro; Imamura, Takeshi; Honda, Hidemasa; Sawaki, Toru; and Sasaki, Hideharu, 4,590,055, Cl. 423-447.400.

Di Settembrini, Antoine. Machine for producing containers from extruded and blow-molded plastic material. 4,589,837, Cl. 425-522.000.

Ditta, Gary S.: *See—*
Helinski, Donald R.; and Ditta, Gary S., 4,590,163, Cl. 435-317.000.

Dittmar, Charles J., Jr.: *See—*
Hofmann, Lee G.; and Dittmar, Charles J., Jr., 4,590,567, Cl. 364-434.000.

Djabbarah, Nizar F., to Mobil Oil Corporation. Method and apparatus for determining effectiveness of foamant in porous media. 4,589,276, Cl. 73-60.100.

DOBFAR S.p.A.: *See—*
Marsili, Leonardo; Falciani, Marco; and Broggi, Renato, 4,590,185, Cl. 514-183.000.

Dobhan, Herbert: *See—*
Brandenstein, Manfred; Haas, Roland; Herrmann, Gerhard; Dobhan, Herbert; and Hans, Rudiger, 4,589,860, Cl. 474-161.000.

Dr. Beck & Co. Aktiengesellschaft: *See—*
Reiter, Udo; and Lehmann, Helmut, 4,590,025, Cl. 264-103.000.

Dr.-Ing. Rudolf Hell GmbH: *See—*
Wellendorf, Klaus, 4,590,515, Cl. 358-75.000.

Dodge, Dennis W., to Itek Graphix Corp. Simple recording head drive having virtually zero backlash or slippage. 4,589,861, Cl. 474-178.000.

Doerschner, David L.: *See—*
Riedel, Kenneth E.; and Doerschner, David L., 4,589,874, Cl. 604-349.000.

Dohadwalla, Alihussein N.: *See—*
Lal, Bansi; Dohadwalla, Alihussein N.; Aroskar, Vijay A.; Dadkar, Nandkumar K.; Dornauer, Horst; Mascarenhas, Julius; and deSouza, Noel J., 4,590,197, Cl. 514-267.000.

Doherty, Brian J.; and Harvey, Andrew C., to Foster-Miller, Inc. Deployment system. 4,589,484, Cl. 166-179.000.

Dohnomoto, Tadashi; Kubo, Masahiro; and Kito, Haruo, to Toyota Jidosha Kabushiki Kaisha; and Isolite Babcock Refractories Co., Ltd. Composite material reinforced with alumina-silica fibers including mullite crystalline form. 4,590,132, Cl. 428-614.000.

Doi, Yoshikazu; Suzuki, Masane; and Sunaga, Yasumasa, to Fuji Photo Optical Co., Ltd. Holographic endoscope. 4,589,723, Cl. 350-3.830.

Dokos, John H.: *See—*
Sidoti, Daniel R.; Dokos, John H.; Katz, Edward; and Moscowitz, Charles M., 4,590,085, Cl. 426-582.000.

Dombek, Bernard D., to Union Carbide Corporation. Process for the manufacture of alcohols using ruthenium and lanthanide catalysts. 4,590,216, Cl. 518-700.000.

Dombro, Robert A.; and Kirch, William, to Norchem, Inc. Method of polymerizing olefins. 4,590,246, Cl. 526-106.000.

Donaldson Company, Inc.: *See—*
Wydevan, Robert M., 4,589,983, Cl. 210-317.000.

Dondero, Richard F.: *See—*
Barto, John J., Jr.; Walsh, Peter M.; Fitzpatrick, Peter R.; Dondero, Richard F.; Demers, Kenneth P.; and Gardner, Stephen M., 4,590,578, Cl. 364-513.000.

Donegan, Thomas E., to BASF Wyandotte Corporation. Fluidized pigment presscake. 4,589,922, Cl. 106-308.00Q.

Donnelly, Francis M., deceased; and by Donnelly, Marion Y., heir. Method for desulfurizing combustion gases. 4,590,047, Cl. 423-242.000.

Donnelly, Marion Y., heir: *See—*
Donnelly, Francis M., deceased; and Donnelly, Marion Y., heir, 4,590,047, Cl. 423-242.000.

Dornauer, Horst: *See—*
Lal, Bansi; Dohadwalla, Alihussein N.; Aroskar, Vijay A.; Dadkar, Nandkumar K.; Dornauer, Horst; Mascarenhas, Julius; and deSouza, Noel J., 4,590,197, Cl. 514-267.000.

Doroslovac, Slobodan. Gear-based mechanical puzzle. 4,589,663, Cl. 273-155.000.

Dorsett, Preston H., to University of Tennessee Research Corporation, The. Agglutination immunoassay for early phase rubella antibody. 4,590,156, Cl. 435-5.000.

Dow Chemical Company, The: *See—*
Cipriano, Robert A.; and Ezzell, Bobby R., 4,589,963, Cl. 204-72.000.
Frisch, Kurt C., Jr., 4,590,224, Cl. 521-155.000.
Fung, Alexander P.; and Wilson, Charles A., 4,590,279, Cl. 546-345.000.
Hohlfeld, Ronald W., 4,590,241, Cl. 525-132.000.
Mack, Russel T., 4,589,781, Cl. 374-29.000.
Mullins, Michael J.; and Hamlin, Percy J., 4,590,300, Cl. 568-616.000.

Dow Corning Corporation: *See—*
Bauman, Therese M.; and Freiberg, Alan L., 4,590,220, Cl. 521-68.000.
Bauman, Therese M., 4,590,222, Cl. 521-88.000.

Doyle, Terrence W.: *See—*
Vyas, Dolatrai M.; Kaneko, Takushi; and Doyle, Terrence W., 4,590,074, Cl. 544-58.200.

Drage, David J., to Tegal Corporation. Plasma reactor having slotted manifold. 4,590,042, Cl. 422-186.060.

Drauz, Karlheinz; and Kleemann, Axel, to Degussa Aktiengesellschaft. Process for the selective production of dihydroxybenzenes. 4,590,305, Cl. 568-771.000.

Dreizler, Selma. Spacer for reinforcement mats. 4,589,244, Cl. 52-685.000.

Drent, Eit, to Shell Oil Company. Process for the preparation of 1,4-butanediol. 4,590,311, Cl. 568-852.000.

Dretler, Stephen P. Expandable dilator-catheter. 4,589,868, Cl. 604-96.000.

Drews, Thomas A.: *See*—
Laughlin, Donald E.; Wilson, Robert F.; and Drews, Thomas A., 4,589,419, Cl. 128-663.000.

Dreyer, Perry A.: *See*—
Knight, Gerard S.; Dreyer, Perry A.; and Gjelhaug, Robert B., 4,589,576, Cl. 222-357.000.

Dropkin, Herbert: *See*—
Wortman, Donald E.; Dropkin, Herbert; and Leavitt, Richard P., 4,590,596, Cl. 372-2.000.

Drosdick, Joseph W., to Revere Copper and Brass Incorporated. Single phase copper-nickel-aluminum-alloys. 4,589,938, Cl. 148-435.000.

Drouzas, Nicolas: *See*—
Holvoet, Marcel, 4,589,166, Cl. 19-82.000.

Du Bois, Jerry M.; and Spanjer, Keith G., to Motorola, Inc. Method of fabricating a high current package with multi-level leads. 4,589,195, Cl. 29-588.000.

Duerwald, Dierk; and Cittrich, Jurgen, to Mannesmann Aktiengesellschaft. Multiple wheel steering mechanism. 4,589,510, Cl. 180-140.000.

Duffner, August, to Kadia-Diamant Maschinen- und Werkzeugfabrik O. Kopp GmbH & Co. Boring and deburring head and boring and deburring tool capable of being fastened therein, and method for boring and deburring a workpiece. 4,589,805, Cl. 408-21.000.

Dufour, Eric: *See*—
Marhic, Gerard; and Dufour, Eric, 4,590,354, Cl. 219-121.0PM.

Dumery, Stefaan D., to Sprague Electric Company. Fine resolution liquid level detector. 4,589,282. Cl. 73-313.000.

Dungan, David L. Sit-kneel chair. 4,589,699, Cl. 297-423.000.

Dunlop Limited: *See*—
Colford, Terence H.; and Harrison, Reginald, 4,589,347, Cl. 105-224.100.

Dunn, Richard L.; Terry, Richard N.; Cowsar, Donald R.; and Casper, Robert A., to Southern Research Institute. Disposable spermicide-releasing diaphragm. 4,589,880, Cl. 604-892.000.

Du Pont de Nemours, E. I., and Company: *See*—
Andrews, Gerald D., 4,590,252, Cl. 526-329.700.
Cocuzza, Anthony J., 4,590,274, Cl. 544-396.000.
Cole, Paul M., 4,589,864, Cl. 494-20.000.
Ernst, Richard E., 4,590,285, Cl. 549-509.000.
Ernst, Richard E., 4,590,312, Cl. 568-861.000.
Haber, Stephen B., 4,590,205, Cl. 514-438.000.
Houtz, Timothy W.; and Lovendusky, Charles M., 4,589,188, Cl. 29-566.200.
Kasper, William W.; Quon, Willard L.; and Van Domelen, Timothy D., 4,590,054, Cl. 423-467.000.
Resnick, Paul R., 4,590,015, Cl. 260-544.00F.
Rorer, Morris P., 4,589,909, Cl. 71-90.000.
Troy, Daniel J., 4,590,235, Cl. 524-439.000.
Vasta, Joseph A., 4,589,999, Cl. 252-511.000.

Dupre, Sylvain: *See*—
Warszawski, Bernard; Fauvel, Pierre; and Dupre, Sylvain, 4,590,135, Cl. 429-38.000.

Dupree, Inc.: *See*—
Dupree, James N.; and Peterson, Jack E., 4,589,774, Cl. 356-436.000.

Dupree, James N.; and Peterson, Jack E., to Dupree, Inc. Sperm densimeter. 4,589,774, Cl. 356-436.000.

Durckheimer, Walter: *See*—
Scheunemann, Karl-Heinz; Mencke, Burkhard; Blumbach, Jurgen; Durckheimer, Walter; and Fleischmann, Klaus, 4,590,267, Cl. 544-27.000.

Durkoppwerke GmbH: *See*—
Goldbeck, Heinz; Plassmeier, Horst; and Moller, Klaus, 4,589,358, Cl. 112-68.000.

Durremberger, Pierre, to Office National d'Etudes et de Recherche Aerospatiales (ONERA). Trihedron-shaped deformable reflectors. 4,589,740, Cl. 350-487.000.

Dusch, Albert, to Pfaff Industriemaschinen GmbH. Thread cutting device in lockstitch sewing machines. 4,589,362, Cl. 112-292.000.

Dworok, Roman: *See*—
Barton, Piotr; Krzystolik, Pawel; Sliz, Jan; Dworok, Roman; Lebecki, Kazimierz; and Slotwinski, Ryszard, 4,590,373, Cl. 250-308.000.

Dyckerhoff & Widmann Aktiengesellschaft: *See*—
Schambeck, Herbert, 4,589,156, Cl. 14-4.000.

Dynacycle Corporation: *See*—
Irwin, Everett F., 4,589,328, Cl. 91-498.000.

Dynamit Nobel AG: *See*—
Kuhnel, Werner; and Spielau, Paul, 4,590,221, Cl. 521-85.000.

Dyott, Richard B., to Andrew Corporation. Optical-fiber directional coupler using boron oxide as interstitial material. 4,589,725, Cl. 350-96.150.

Dyott, Richard B.; Ulrich, Reinhard; and Meyer, John D., to Andrew Corporation. Optical fiber polarizer. 4,589,728, Cl. 350-96.300.

E. R. Squibb & Sons, Inc.: *See*—
Sivilich, Daniel M., 4,589,877, Cl. 604-385.00R.

E-Systems, Inc.: *See*—
Goggin, John C., 4,590,439, Cl. 331-1.00A.

Easter, William M.: *See*—
Lerner, Hershey; Easter, William M.; and Wehrmann, Rick S., 4,589,165, Cl. 17-11.000.

Eastman Kodak Company: *See*—
Arter, Thomas C.; and Ponticello, Ignazio S., 4,590,151, Cl. 430-537.000.
Bogan, Richard T.; and Kuo, Chung-Ming, 4,590,265, Cl. 536-63.000.
Phillips, Bobby M., 4,590,032, Cl. 264-555.000.
Strobel, Joseph R., 4,589,749, Cl. 354-221.000.

Eaton Corporation: *See*—
Gritter, David J.; and O'Neil, Walter K., 4,590,413, Cl. 318-803.000.
Regnier, John A.; and Savage, Edward, 4,590,477, Cl. 343-17.700.

Eberle, Manfred; and Kleemann, Robert, to Mantec Gesellschaft fur Automatisierungs-und Handhabungssysteme mbH. Robot joint. 4,589,816, Cl. 414-680.000.

Ebihara, Hideyuki: *See*—
Kokubo, Eiichi; Goi, Koichi; Arikawa, Junichi; Ebihara, Hideyuki; -and Chiba, Hiroshi, 4,589,708, Cl. 312-71.000.

Eckell, Albrecht: *See*—
Schornick, Gunnar; Jun, Mong-Jon; Sanner, Axel; Lehner, August; Lenz, Werner; Richter, Peter; and Eckell, Albrecht, 4,590,144, Cl. 430-273.000.

Economics Laboratory, Inc.: *See*—
Wolf, Stephen F.; and Liu, Chung-Tsing, 4,590,014, Cl. 260-502.40R.

Edelbruck, Pierre; Melzac, Georges; and Caullet, Bernard, to Manufacture de Machines du Haut-Rhin. Self-calibrating products system and method. 4,589,554, Cl. 209-546.000.

Edmonds, Harold D.; and Kulkarni, Murlidhar V., to International Business Machines Corp. Method for determining oxygen and carbon in silicon semiconductor wafer having rough surface. 4,590,574, Cl. 364-498.000.

Eduard Wille GmbH & Co.: *See*—
Neuhaus, Klaus, 4,589,289, Cl. 73-862.230.

Edwall, Bengt; and Karlsson, Hans, to Sydkraft AB. Method for the purification of flue gases. 4,590,046, Cl. 423-242.000.

Edwards, William B., III, to Philip Morris Incorporated. Nicotine analogs. 4,590,278, Cl. 546-281.000.

Efferding, Larry E.: *See*—
Machado, Octavio J.; and Efferding, Larry E., 4,590,383, Cl. 250-506.100.

Ehrenfeld, Udo. Agent facilitating liposome cellular wall transport, a method for the production thereof and its use. 4,590,060, Cl. 424-1.100.

Ehrenfreund, Josef; and Fory, Werner, to Ciba-Geigy Corporation. Fused N-phenylsulfonyl-N-triazinylureas. 4,589,911, Cl. 71-91.000.

Eiber, Kevin J. Ski pylon. 4,589,366, Cl. 114-363.000.

Eibofner, Eugen: *See*—
Loge, Hans; Eibofner, Eugen; and Mossle, Walter, 4,589,847, Cl. 433-126.000.

Eichen, Erwin; and Flasck, James D., to Energy Conversion Devices, Inc. Molding tool and method. 4,590,031, Cl. 264-338.000.

Eide, Donald A.: *See*—
Bocchi, Curtis J.; Eide, Donald A.; and Hart, Rebecca A., 4,590,511, Cl. 358-21.00R.

Eikman, Edward A. Microbial monitor. 4,590,158, Cl. 435-34.000.

Eilert, John H.; Levin, Arthur L.; and Thomas Julian, to International Business Machines Corporation. Internally distributed monitoring system. 4,590,550, Cl. 364-200.000.

Eisai Co., Ltd.: *See*—
Tomiuga, Takashi; Nomura, Keiichi; and Tajima, Tetsuya, 4,590,207, Cl. 514-470.000.

Eisenlohr, Franz, to Sulzer Brothers Limited. Leno attachment for a weaving machine. 4,589,450, Cl. 139-54.000.

Electric Power Research Institute Inc.: *See*—
Bedell, John R.; Friedmann, Paul G.; Kushnick, Julian H.; Rosenthal, Eli; Hubbard, James R.; and Zingler, Christian J., 4,589,470, Cl. 164-463.000.

Electricite de France (Service National): *See*—
Panet, Michel, 4,589,440, Cl. 137-486.000.
Vandenberghe, Claude; and Le Morvan, Andre , 4,590,430, Cl. 324-427.000.

Electro Sound, Inc.: *See*—
Rehklau, George D.; Cotterill, Lee A.; and Langevin, Robert Z., 4,589,608, Cl. 242-195.000.

Electrolux Corporation: *See*—
del Valle, Jorge L., 4,589,448, Cl. 138-122.000.

Elektro-Thermit GmbH: *See*—
Kempa, Bernd-Joachim, 4,589,617, Cl. 246-388.000.

Eli Lilly and Company: *See*—
Beck, James R., 4,589,905, Cl. 71-66.000.
Stark, Paul, 4,590,213, Cl. 514-653.000.

Eller, John: *See*—
Van Dal, David J., 4,589,377, Cl. 123-25.00C.

Ellery, John M., Sr., to Beloit Corporation. Apparatus for controlling a variable speed gearmotor. 4,589,598, Cl. 241-37.000.

Ellin, Robert I.; and Zvirblis, Peter, to United States of America, Army. Method for separating and measuring the amount of polar compounds and their metabolites in aqueous solutions. 4,590,166, Cl. 436-96.000.

Ellis, Kenneth R., to Thetford International Products, Ltd. Briquette making machine. 4,589,832, Cl. 425-289.000.
Elpiner, Boris, to Mark Controls Corporation. Control system for flow control valves. 4,590,576, Cl. 364-510.000.
Elscint Ltd.: *See*—
Fenster, Paul; and Inbar, Dan, 4,590,518, Cl. 358-111.000.
Empire Enterprises, Inc.: *See*—
Renegar, Charles G.; and Agee, Russell D., 4,589,367, Cl. 118-66.000.
Emplit, Raymond H., to Robertshaw Controls Company. Dielectric compensated level control system for use in tanks containing substance. 4,590,575, Cl. 364-509.000.
Endo, Makoto: *See*—
Yanagi, Masaaki; Ono, Satoshi; Toda, Takao; Kashiwagi, Kazuo; Endo, Makoto; and Saito, Yoshihiro, 4,589,767, Cl. 355-45.000.
Energy Conversion Devices, Inc.: *See*—
Eichen, Erwin; and Flasck, James D., 4,590,031, Cl. 264-338.000.
Nath, Prem; Barnard, Timothy J.; and Crea, Dominic, 4,590,327, Cl. 136-256.000.
Yaniv, Zvi; Bar-on, Yair; Cannella, Vincent D.; and Hansell, Gregory L., 4,589,733, Cl. 350-332.000.
Engelmore, Anthony R. Rotatable electrical connector for coiled telephone cords. 4,590,337, Cl. 179-186.000.
Environmental Research Institute of Michigan: *See*—
Kauth, Richard J., 4,590,607, Cl. 382-41.000.
Equihua Zamora, Luis F.: *See*—
Sanchez Aguilar, Ricardo B.; Mendez, Francisco R.; Equihua Zamora, Luis F.; and Soto Curiel, Carlos D., 4,589,445, Cl. 137-616.700.
Equipment Company of America: *See*—
Kedem, Tuval, 4,589,669, Cl. 280-43.120.
Erat, August, to Robert Bosch GmbH. Dipole antenna for portable radio. 4,590,614, Cl. 455-270.000.
Erb, Tom L., to Ramsey Engineering Company. Apparatus and method for digital specific gravity measurement. 4,590,579, Cl. 364-558.000.
Erckel, Rudiger; Franz, Raimund; Woernle, Rolf; and Riehm, Theodor, to Hoechst Aktiengesellschaft. Process for hydrolyzing cellulose-containing material with gaseous hydrogen fluoride. 4,589,924, Cl. 127-37.000.
Ergenics, Inc.: *See*—
Goodell, Paul D.; Huston, Ernest L.; Rudman, Peter S.; and Sandrock, Gary D., 4,589,919, Cl. 75-251.000.
Erhard, Raymond, to SMID S.A. Device for closing up the grooves in the table of a machine saw. 4,589,641, Cl. 269-289.00R.
Erickson, John S. Ski pole modifying apparatus. 4,589,681, Cl. 280-819.000.
Ernryd, Leif, to Sweden Recycling AB. Valve for suction installation. 4,589,442, Cl. 137-546.000.
Ernst, Richard E., to Du Pont de Nemours, E. I., and Company. Process for preparing a mixture of tetrahydrofuran and 3-alkyl tetrahydrofuran and copolymers thereof. 4,590,285, Cl. 549-509.000.
Ernst, Richard E., to Du Pont de Nemours, E. I., and Company. Process for preparing 2-alkyl-1,4-butanediols. 4,590,312, Cl. 568-861.000.
ERSA Ernst Sachs KG GmbH & Co.: *See*—
Bernard, Jurgen, 4,590,363, Cl. 219-497.000.
Erwied, Werner; Wegemund, Bernd; Wedl, Peter; and Worschech, Kurt, to Henkel Kommanditgesellschaft auf Aktien. Stabilization of polyvinyl chloride. 4,590,233, Cl. 524-357.000.
Eseifan, Ali H.; and Badgley, Laurence E. Apparatus for selective measuring and treating disordered tissues. 4,589,417, Cl. 128-422.000.
Esselte Security Systems AB: *See*—
Rothfjell, Rolf E., 4,590,366, Cl. 235-494.000.
Esser, Leonard J. M., to U.S. Philips Corporation. Charge-coupled buried-channel device with high-resistivity gate electrodes. 4,590,506, Cl. 357-24.000.
Esser, Leonard J. M.; Vaes, Henricus M. J.; and Ludikhuize, Adrianus W., to U.S. Philips Corporation. MIS high-voltage element with high-resistivity gate and field-plate. 4,590,509, Cl. 357-53.000.
Ethyl Corporation: *See*—
Maloney, John R.; and Ramachandran, Venkataraman, 4,590,013, Cl. 558-332.000.
Ramachandran, Venkataraman; Davidson, Robert I.; and Maloney, John R., 4,590,010, Cl. 558-341.000.
Ramachandran, Venkataraman, 4,590,012, Cl. 58-332.000.
Etzel, Karl W. F., to Sigri GmbH. Lining for an electrolysis cell for the production of aluminum. 4,589,967, Cl. 204-243.00R.
Evans, John F.: *See*—
Bamji, Pervez J. F.; Evans, John F.; and Fitzpatrick, Nigel P., 4,589,637, Cl. 266-234.000.
Evans, John T.; and Kostelnicek, Richard J., to Exxon Production Research Co. Offset removal in an analog to digital conversion system. 4,590,458, Cl. 340-347.0AD.
Everts, Robert G., to Inertia Dynamics Corp. Carburetor priming system for internal combustion engines. 4,589,386, Cl. 123-187.50R.
Ex-Cell-O Corporation: *See*—
Murrah, Howard E., 4,589,862, Cl. 493-183.000.
Exxon Production Research Co.: *See*—
Bragg, James R.; and Gale, Walter W., 4,589,998, Cl. 252-330.000.
Evans, John T.; and Kostelnicek, Richard J., 4,590,458, Cl. 340-347.0AD.
Kelley, Bruce T., 4,589,434, Cl. 137-1.000.
Exxon Research & Engineering Co.: *See*—
Cleveland, William K. S.; Ryer, Jack; and Deen, Harold E., 4,589,993, Cl. 252-78.500.
Foroulis, Z. Andrew, 4,590,036, Cl. 422-13.000.
Klemann, Lawrence P., 4,590,288, Cl. 556-112.000.
Richard, Michael A.; Vanderspurt, Thomas H.; and Montagna, Angelo A., 4,590,177, Cl. 502-328.000.
Roxlo, Charles B.; and Persans, Peter D., 4,590,399, Cl. 310-334.000.
Ryer, Jack; Shih, Chung Kun; and Williams, John E., 4,589,991, Cl. 252-47.000.
Ezzell, Bobby R.: *See*—
Cipriano, Robert A.; and Ezzell, Bobby R., 4,589,963, Cl. 204-72.000.
Faehnle, Erich, to PKA Pyrolyse Kraftanlagen GmbH. Apparatus for the recovery of gases from waste materials. 4,589,354, Cl. 110-246.000.
Fake, Charles S.; and Burrell, Gordon, to Beecham Group p.l.c. Benzisothiazoles, their pharmaceutical compositions, and method of use. 4,590,192, Cl. 514-231.000.
Falciani, Marco: *See*—
Marsili, Leonardo; Falciani, Marco; and Broggi, Renato, 4,590,185, Cl. 514-183.000.
Falcon Jet Corporation: *See*—
Ryan, James M., 4,589,463, Cl. 160-88.000.
Fantuzzo, Joseph; Monkelbaan, Edwin R.; and Till, Henry R., to Xerox Corporation. Reproducing apparatus with optic scanning module. 4,589,759, Cl. 355-8.000.
Fanuc Ltd: *See*—
Obara, Haruki; Izumiya, Shunzo; Okuyama, Yuji; and Sakurai, Akihiro, 4,590,353, Cl. 219-69.00C.
Farago, Laszlo : *See*—
Tamasi, Attila; Kardos, Mihaly; and Farago, Laszlo , 4,589,273, Cl. 73-11.000.
Farge, Daniel: *See*—
Corbet, Jean-Pierre; Cotrel, Claude; Farge, Daniel; and Paris, Jean-Marc, 4,590,004, Cl. 530-317.000.
Farina, Alfred J., to Thermocatalytic Corp. Spiral corrugated corrosion resistant heat exchanger. 4,589,374, Cl. 122-14.000.
Faul, Albert, Jr., to Faul Manufacturing, Inc. Sunflower header attachment for combine. 4,589,250, Cl. 56-126.000.
Faul Manufacturing, Inc.: *See*—
Faul, Albert, Jr., 4,589,250, Cl. 56-126.000.
Fauvel, Pierre: *See*—
Warszawski, Bernard; Fauvel, Pierre; and Arlie, Jean, 4,590,134, Cl. 429-35.000.
Warszawski, Bernard; Fauvel, Pierre; and Dupre, Sylvain, 4,590,135, Cl. 429-38.000.
Favro, Lawrence D.: *See*—
Thomas, Robert L.; Kuo, Pao-Kuang; and Favro, Lawrence D., 4,589,783, Cl. 374-45.000.
Fawley, Norman C. Structures reinforced by a composite material. 4,589,562, Cl. 220-3.000.
Fay, John E., to Biomedical Polymers, Inc. Sputum collection apparatus. 4,589,548, Cl. 206-363.000.
Fedotova, Natalya S.: *See*—
Yurkov, Leonid I.; Busse-Machukas, Vladimir B.; Lvovich, Florenty I.; Kubasov, Vladimir L.; Uzbekov, Alexandr A.; Mazanko, Anatoly F.; and Fedotova, Natalya S., 4,589,969, Cl. 204-290.00F.
Feeley, George F.: *See*—
Cioca, Gheorge; Feeley, George F.; Brabson, Joseph B.; and Barth, Peter, 4,590,022, Cl. 264-41.000.
Feilchenfeld, Michal M., to Westinghouse Electric Corp. Voice-recognition elevator security system. 4,590,604, Cl. 381-42.000.
Feldman, Nathan W. Optical telephone. 4,590,620, Cl. 455-614.000.
Felix, Raymond A., to Stauffer Chemical Company. Amidomethyl ester herbicides. 4,589,907, Cl. 71-86.000.
Feniou, Claude: *See*—
Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Prat, Gisele; and Pontagnier, Henri, 4,590,193, Cl. 514-253.000.
Fenster, Paul; and Inbar, Dan, to Elscint Ltd. Arrangement for processing data in digital fluorographic systems. 4,590,518, Cl. 358-111.000.
Fenton, John W. Internal combustion engine. 4,589,388, Cl. 123-241.000.
Fenwick, James R.: *See*—
Chang, Yi M.; and Fenwick, James R., 4,589,526, Cl. 188-74.000.
Ferag AG: *See*—
Staub, Samuel, 4,589,606, Cl. 242-76.000.
Fergg, Berthold: *See*—
Fursich, Manfred; Findeis, Gunter; Treiber, Helmut; Fergg, Berthold; and Thurm, Siegfried, 4,589,766, Cl. 355-38.000.
Ferguson, Barry G.: *See*—
Thatcher, Gordon; Ferguson, Barry G.; and Winstanley, John P., 4,590,347, Cl. 219-10.49R.
Ferguson, Sam; and Reese, Darrell D., to Nalco Chemical Company. Upgrading heavy gas oils. 4,589,979, Cl. 208-263.000.
Ferrero, Pietro, to Ferrero S.p.A. Package for food products. 4,589,553, Cl. 206-525.000.
Ferrero S.p.A.: *See*—
Ferrero, Pietro, 4,589,553, Cl. 206-525.000.
Ferro Manufacturing Corporation: *See*—
Bickerstaff, David J., 4,589,227, Cl. 49-227.000.
Fiberite Corporation: *See*—
Levin, Jordan, 4,590,122, Cl. 428-260.000.
Fichtel & Sachs AG: *See*—
Axthammer, Ludwig; and Wossner, Felix, 4,589,528, Cl. 188-279.000.
Fiers, Thomas A.: *See*—
Laatt, Richard G.; Fiers, Thomas A.; and Andrews, Thomas L., Jr., 4,590,526, Cl. 360-78.000.

Fillpro Products, Inc.: *See—*
Johnson, Dwight N., 4,589,688, Cl. 285-12.000.
Findeis, Gunter: *See—*
Fursich, Manfred; Findeis, Gunter; Treiber, Helmut; Fergg, Berthold; and Thurm, Siegfried, 4,589,766, Cl. 355-38.000.
Findlay, John W. A.: *See—*
Coker, Geoffrey G.; and Findlay, John W. A., 4,590,199, Cl. 514-343.000.
Finkenbeiner, Gerhard. Glass harmonica. 4,589,322, Cl. 84-402.000.
Finster, Emma R.; and Finster, Peter W. Adjustable implement holder for stepladders. 4,589,521, Cl. 182-129.000.
Finster, Peter W.: *See—*
Finster, Emma R.; and Finster, Peter W., 4,589,521, Cl. 182-129.000.
Fischer, Ekkehard: *See—*
Loukas, Paul W.; Braune, Rudolf E.; and Fischer, Ekkehard, 4,589,844, Cl. 432-223.000.
Fischer-Flack, Inc.: *See—*
McDonald, Theodore R.; and Hetzner, Randall H., 4,590,364, Cl. 235-98.00C.
Fischer, Hermann, to M.A.N. Roland Druckmaschinen Aktiengesellschaft. Rubber blanket for an offset rotary printing machine. 4,589,339, Cl. 101-217.000.
Fischer, Jurgen: *See—*
Zeiner, Hartmut; Fischer, Jurgen; Heinz, Gerhard; Neumann, Peter; Nissen, Dietmar; and Schaefer, Gerhard, 4,590,104, Cl. 427-389.900.
Fisher, Edmund A.: *See—*
Kelly, Thomas P.; and Fisher, Edmund A., 4,589,493, Cl. 166-341.000.
Fisher, Michael H.: *See—*
Bochis, Richard J.; Chabala, John C.; and Fisher, Michael H., 4,590,201, Cl. 514-359.000.
Fisons plc: *See—*
Forrester, Raymond B.; and Boardman, Terence D., 4,590,206, Cl. 514-456.000.
Fitzke, Emil V.: *See—*
Colacello, Michael A.; Fitzke, Emil V.; and Otto, Jack F., 4,589,902, Cl. 65-252.000.
Fitzpatrick, Nigel P.: *See—*
Bamji, Pervez J. F.; Evans, John F.; and Fitzpatrick, Nigel P., 4,589,637, Cl. 266-234.000.
Fitzpatrick, Peter R.: *See—*
Barto, John J., Jr.; Walsh, Peter M.; Fitzpatrick, Peter R.; Dondero, Richard F.; Demers, Kenneth P.; and Gardner, Stephen M., 4,590,578, Cl. 364-513.000.
Fjellman, Bo, to Fjellman Press AB. Hydraulic press. 4,589,836, Cl. 425-406.000.
Fjellman Press AB: *See—*
Fjellman, Bo, 4,589,836, Cl. 425-406.000.
FL Industries, Inc.: *See—*
Decandia, Giovanni, 4,590,544, Cl. 362-368.000.
Flanigan, Sean T.: *See—*
Sampson, Robert C.; and Flanigan, Sean T., 4,589,238, Cl. 52-200.000.
Flasck, James D.: *See—*
Eichen, Erwin; and Flasck, James D., 4,590,031, Cl. 264-338.000.
Fleche, Guy: *See—*
Gaset, Antoine; Rigal, Luc; Paillassa, Gilles; Salome , Jean-Paul; and Fleche, Guy, 4,590,283, Cl. 549-488.000.
Fleischmann, Klaus: *See—*
Scheunemann, Karl-Heinz; Mencke, Burkhard; Blumbach, Jurgen; Durckheimer, Walter; and Fleischmann, Klaus, 4,590,267, Cl. 544-27.000.
Fleissner, Gerold, to Vepa Aktiengesellschaft. Apparatus for crimping synthetic filament groups. 4,589,173, Cl. 28-269.000.
Flemstofte-Mads Amby Maskinfabriker A/S: *See—*
Andersen, Arne L., 4,589,334, Cl. 99-534.000.
Fleury, Georges, to Thomson-CSF. Delay line of the ceiling and ring type or of the ceiling and bar type. 4,590,447, Cl. 333-156.000.
Flo-Bob Industries Inc.: *See—*
Roberts, Tiner E., 4,589,231, Cl. 51-124.00L.
Floh, Hubert: *See—*
Misera, Erich; Floh, Hubert; and Haargassner, Reinhard, 4,589,468, Cl. 164-418.000.
Florek, Florian F. Orthopaedic appliance for use in treating acromioclavicular joint injuries. 4,589,406, Cl. 128-87.00R.
FMC Corporation: *See—*
Bull, Randy A., 4,590,286, Cl. 549-526.000.
Shimp, Lawrence A., 4,590,051, Cl. 423-315.000.
Forbes, Hampton E., Jr., to Westvaco Corporation. Food holder. 4,589,619, Cl. 248-174.000.
Force Control Industries, Inc.: *See—*
Brown, John B.; and Kelley, Reginald D., 4,589,818, Cl. 414-744.00A.
Ford, James M., to Olin Corporation. Membrane cell jumper switch. 4,589,966, Cl. 204-228.000.
Ford Motor Company: *See—*
Strikis, Guntis V.; and Bekheet, Zaki C., 4,589,536, Cl. 192-35.000.
Foroulis, Z. Andrew, to Exxon Research and Engineering Co. Process for corrosion inhibition utilizing an antimony-molybdenum salt corrosion inhibitor composition. 4,590,036, Cl. 422-13.000.
Forrester, Raymond B.; and Boardman, Terence D., to Fisons plc. Inhalation pharmaceuticals. 4,590,206, Cl. 514-456.000.
Fory, Werner: *See—*
Ehrenfreund, Josef; and Fory, Werner, 4,589,911, Cl. 71-91.000.
Thummel, Rudolph C.; and Fory, Werner, 4,589,912, Cl. 71-93.000.
Foshee, William R.; and Carey, Kevin, to Best Lock Corporation. Lever handle mortise lock. 4,589,691, Cl. 292-165.000.
Foster, Donald D., to Realex Corporation. Dispensing pump having collar-to-body anti-rotation interlock. 4,589,574, Cl. 222-153.000.
Foster-Miller, Inc.: *See—*
Doherty, Brian J.; and Harvey, Andrew C., 4,589,484, Cl. 166-179.000.
Foundation: The Research Institute for Special Inorganic Materials, The: *See—*
Hasegawa, Yoshio; Kobori, Takeo; and Fukuda, Kazushige, 4,590,253, Cl. 528-14.000.
Fournier, Yves, to Creusot-Loire. Holding device for a tube bundle. 4,589,618, Cl. 248-68.100.
Frame, Wayne W.; and Trumbull, Robert E., to Ball Corporation. Method and apparatus for detecting and filling-in dead spots of video signals from an image sensor. 4,590,520, Cl. 358-163.000.
Frank, Howard L.: *See—*
Karim, Frank; Frank, Howard L.; and Hopman, Nicholas C., 4,589,401, Cl. 123-479.000.
Franz, Raimund: *See—*
Erckel, Rudiger; Franz, Raimund; Woernle, Rolf; and Riehm, Theodor, 4,589,924, Cl. 127-37.000.
Franzolini, Marc; and Marjollet, Jacques, to Stein Industrie. Steam separator superheater and method of assembly. 4,589,893, Cl. 55-269.000.
Frederick & Herrud, Inc.: *See—*
Kanski, Richard O., 4,589,318, Cl. 83-409.100.
Freeburg, Thomas A.: *See—*
Burke, Timothy M.; Noble, Scott W.; Freeburg, Thomas A.; and Krebs, Jay R., 4,590,473, Cl. 340-825.520.
Freiberg, Alan L.: *See—*
Bauman, Therese M.; and Freiberg, Alan L., 4,590,220, Cl. 521-68.000.
Frentzel, Richard L.: *See—*
O'Connor, James M.; and Frentzel, Richard L., 4,590,255, Cl. 528-71.000.
Frenzel, Bertram: *See—*
Marx, Karl; Offermann, Peter; Reumann, Ralf-Dieter; Magel, Matthias; Frenzel, Bertram; and Grenzendorfer, Dietmar, 4,589,169, Cl. 19-304.000.
Friedman, Aaron. Electrosurgical spark-gap cutting blade. 4,589,411, Cl. 128-303.140.
Friedmann, Paul G.: *See—*
Bedell, John R.; Friedmann, Paul G.; Kushnick, Julian H.; Rosenthal, Eli; Hubbard, James R.; and Zingler, Christian J., 4,589,470, Cl. 164-463.000.
Friedrich, Hans G.: *See—*
Gillner, Manfred; Friedrich, Hans G.; Grau, Christian; Crumbach, Richard; Schoil, Heinz; and Hiemenz, Christian, 4,590,030, Cl. 264-331.190.
Friedrich, Karl: *See—*
Ashikawa, Noboru; Friedrich, Karl; and Lanzer, Heribert, 4,589,304, Cl. 74-701.000.
Frisch, Kurt C., Jr., to Dow Chemical Company, The. Siloxane-containing polyisocyanurate. 4,590,224, Cl. 521-155.000.
Frischmann, Peter G.: *See—*
Gigliotti, Francis X., Jr.; Perocchi, Lee C.; and Frischmann, Peter G., 4,589,471, Cl. 164-463.000.
Fritz Bauer & Sohne oHG: *See—*
Bauer, Hans-Peter; and Bauer, Hans J., 4,589,697, Cl. 297-300.000.
Fritzinger, George H. Traffic control system using timed blink signal and road marker. 4,590,455, Cl. 340-907.000.
Frohling, Werner: *See—*
Iniotakis, Nicolas; von der Decken, Claus-Benedict; and Frohling, Werner, 4,589,891, Cl. 55-158.000.
Fuchs, Hans-Georg: *See—*
Horch, Frank; Brockmann, Hermann; and Fuchs, Hans-Georg, 4,589,623, Cl. 249-83.000.
Fuchs, Henry. Graphics display system using logic-enhanced pixel memory cells. 4,590,465, Cl. 340-723.000.
Fuehrer, Calvin L.: *See—*
Brockhaus, Donald B.; Fuehrer, Calvin L.; Swartz, Walter E.; and Sietmann, Vernon H., 4,589,332, Cl. 98-55.000.
Fuji Jukogyo Kabushiki Kaisha: *See—*
Takahashi, Toshio, 4,590,566, Cl. 364-431.110.
Fuji Photo Film Co., Ltd.: *See—*
Akiyoshi, Yutaka; Kobayashi, Shinzo; Kakimi, Fujio; and Matsukawa, Hiroharu, 4,590,170, Cl. 436-533.000.
Fujita, Yoshihiro, 4,590,150, Cl. 430-372.000.
Hirai, Hiroyuki; Yabuki, Yoshiharu; Takeuchi, Masashi; and Aono, Toshiaki, 4,590,154, Cl. 430-559.000.
Horikawa, Kazuo, 4,590,369, Cl. 250-252.100.
Kato, Hisatoyo; and Komaki, Takao, 4,590,517, Cl. 358-111.000.
Kawagishi, Toshio; and Furutachi, Nobuo, 4,590,153, Cl. 430-551.000.
Ohmura, Hiroshi, 4,589,748, Cl. 354-195.120.
Oishi, Kengo; and Suzuki, Osamu, 4,589,609, Cl. 242-198.000.
Sato, Kozo; and Naito, Hideki, 4,590,152, Cl. 430-543.000.
Takahashi, Hiroshi; Tamaki, Hiroyuki; Ohishi, Chikashi; and Shiba, Keisuke, 4,590,148, Cl. 430-303.000.
Taniguchi, Yutaka; and Kato, Hisatoyo, 4,589,731, Cl. 350-319.000.
Fuji Photo Optical Co., Ltd.: *See—*
Doi, Yoshikazu; Suzuki, Masane; and Sunaga, Yasumasa, 4,589,723, Cl. 350-3.830.

Fuji Xerox Co., Ltd.: *See—*
Noguchi, Akio; Moriguchi, Haruhiko; Inui, Toshiharu; and Hisatake, Masayuki, 4,590,487, Cl. 346-76.0PH.

Fujii, Haruo: *See—*
Toyono, Tsutomu; Sakemi, Yuji; and Fujii, Haruo, 4,590,496, Cl. 346-153.100.

Fujii, Takayoshi: *See—*
Maeda, Yuji; Yamato, Hideyuki; Fujii, Takayoshi; Kobayashi, Yasuhiko; Saito, Kenichi; Kato, Tadaaki; and Yoshikumi, Chikao, 4,590,184, Cl. 514-167.000.

Fujikawa, Tetsuzo; and Tamba, Shinichi, to Kawasaki Jukogyo Kabushiki Kaisha. Cooling apparatus for water-cooled engines. 4,589,379, Cl. 123-41.490.

Fujimori Kogyo Co., Ltd.: *See—*
Akamatsu, Yoshihiro; Azuma, Tadashi; and Ishida, Toshio, 4,590,534, Cl. 361-212.000.

Fujimura, Fumio; Satake, Toshimi; Mori, Manabu; Minami, Toshiaki; and Fukuchi, Tadakazu, to Jujo Paper Co., Ltd. Heat-sensitive recording sheet. 4,590,499, Cl. 346-209.000.

Fujimura, Fumio: *See—*
Satake, Toshimi; Kimura, Yoshihide; and Fujimura, Fumio, 4,590,500, Cl. 346-209.000.

Fujinami, Minpei: *See—*
Ido, Satoshi; Fujinami, Minpei; Kato, Yasuo; Sakitani, Yoshio; and Ozasa, Susumu, 4,589,773, Cl. 356-371.000.

Fujisawa Pharmaceutical Co., Ltd.: *See—*
Takaya, Takao; Sakane, Kazuo; and Yamanaka, Hideaki, 4,590,186, Cl. 514-202.000.

Fujita, Kazuo. Wheeled carriage. 4,589,345, Cl. 105-170.000.

Fujita, Tamio: *See—*
Tsubokura, Yoshihisa; Yamamoto, Sumio; Aoishi, Eiji; and Fujita, Tamio, 4,590,232, Cl. 524-178.000.

Fujita, Yoshihiro, to Fuji Photo Film Co., Ltd. Method for processing silver halide color photographic light-sensitive material. 4,590,150, Cl. 430-372.000.

Fujitsu Limited: *See—*
Iwasa, Seiichi; Nogiwa, Kengo; and Kaneko, Yoshiya, 4,590,587, Cl. 365-1.000.
Kawamura, Seiichiro, 4,589,951, Cl. 156-617.00R.

Fujiwara, Akira: *See—*
Hatsugai, Satoshi; Kawabata, Yoshiaki; Fujiwara, Akira; Kojima, Hisashi; Harada, Haruo; Kudo, Kesayoshi; and Ohara, Shinya, 4,590,083, Cl. 426-557.000.

Fujiwara, Katsuyoshi, to Sharp Kabushiki Kaisha. Timing adjustment in a copying machine. 4,589,763, Cl. 355-14.00R.

Fujiwara, Takanori: *See—*
Sakurada, Kazuyuki; Fujiwara, Takanori; and Funyu, Yutaka, 4,589,268, Cl. 72-8.000.

Fukuchi, Tadakazu: *See—*
Fujimura, Fumio; Satake, Toshimi; Mori, Manabu; Minami, Toshiaki; and Fukuchi, Tadakazu, 4,590,499, Cl. 346-209.000.

Fukuda, Kazushige: *See—*
Hasegawa, Yoshio; Kobori, Takeo; and Fukuda, Kazushige, 4,590,253, Cl. 528-14.000.

Fukuda, Masuo, to Saikei Giken Kogyo Kabushiki Kaisha. Muffler. 4,589,517, Cl. 181-265.000.

Fukui, Izumu; Hamatsuki, Takeshige; Yano, Takeshi; Sato, Eiichi; and Inui, Osamu, to NEC Corporation. Impact printer head capable of printing a dot at a distance narrower than a thickness of a printer unit. 4,589,786, Cl. 400-124.000.

Fukumoto, Yasuhisha; Moriyama, Noboru; and Itoi, Takashi, to Kao Corporation. Maleic acid copolymer, production thereof and scale-preventing agent containing the same. 4,589,995, Cl. 252-180.000.

Fukumoto, Yoshiko: *See—*
Imaki, Naoshi; and Fukumoto, Yoshiko, 4,590,319, Cl. 585-274.000.

Fukushima, Eiichi; Roeder, Stephen B. W.; Assink, Roger A.; and Gibson, Atholl A. V., to United States of America, Energy. Nuclear magnetic resonance apparatus having semitoroidal rf coil for use in topical NMR and NMR imaging. 4,590,427, Cl. 324-318.000.

Fukushima, Isao; Kobori, Yasunori; and Nishijima, Hideo, to Hitachi, Ltd. Bipolar transistor circuit with FET constant current source. 4,590,438, Cl. 330-300.000.

Funabashi, Hiroshi: *See—*
Inoue, Takeshi; Saito, Hiroyuki; Takewaka, Tomoyuki; and Funabashi, Hiroshi, 4,589,516, Cl. 181-256.000.

Funatsu, Tsunemasa: *See—*
Ohashi, Ryutaro; Hasegawa, Hisashi; Miyoshi, Masao; Iida, Hajime; Mase, Toshiyuki; Tanaka, Takashi; Funatsu, Tsunemasa; and Nakanishi, Tami, 4,589,261, Cl. 62-73.000.

Fung, Alexander P.; and Wilson, Charles A., to Dow Chemical Company, The. Preparation of (trifluoromethyl)pyridines under liquid phase conditions. 4,590,279, Cl. 546-345.000.

Funyu, Yutaka: *See—*
Sakurada, Kazuyuki; Fujiwara, Takanori; and Funyu, Yutaka, 4,589,268, Cl. 72-8.000.

Furomoto, Mitsuru; and Asano, Toshio, to Daicel Chemical Industries, Ltd. High-solid self-adhesive and process for the production thereof. 4,590,238, Cl. 524-745.000.

Fursich, Manfred; Findeis, Gunter; Treiber, Helmut; Fergg, Berthold; and Thurm, Siegfried, to Agfa-Gevaert Aktiengesellschaft. Copying method and arrangement for colored originals. 4,589,766, Cl. 355-38.000.

Furuhashi, Hiroyuki: *See—*
Imai, Masafumi; Yamamoto, Tadashi; Furuhashi, Hiroyuki; Ueno, Hiroshi; and Inaba, Naomi, 4,590,325, Cl. 585-512.000.

Furukawa, Kenji: *See—*
Inoue, Hiromichi; Saito, Shinichi; Terashima, Kanetsugu; Inukai, Takashi; and Furukawa, Kenji, 4,589,996, Cl. 252-299.650.

Furutachi, Nobuo: *See—*
Kawagishi, Toshio; and Furutachi, Nobuo, 4,590,153, Cl. 430-551.000.

Fuscone, Roy. Sole element. 4,589,216, Cl. 36-32.00R.

Fuso Chemical Co., Ltd.: *See—*
Harada, Kaoru; and Shimoyama, Akira, 4,590,260, Cl. 528-328.000.

G.D. Societa per Azioni: *See—*
Mattei, Riccardo, 4,589,426, Cl. 131-84.300.
Riccardo, Mattei; and Belvederi, Bruno, 4,589,811, Cl. 414-224.000.

Gabbert, James D.; Garner, Albert Y.; and Hedrick, Ross M., to Monsanto Company. Process for the preparation of nylon block polymers. 4,590,243, Cl. 525-184.000.

Gabbert, James D.; Garner, Albert Y.; and Hedrick, Ross M., to Monsanto Company. Acid halide functional materials. 4,590,244, Cl. 525-332.300.

Gaddi, Bruno, to Piaggio & C. S.p.A. Variable ratio transmission system, particularly useful for vehicles. 4,589,858, Cl. 474-12.000.

Gaffar, Abdul, to Colgate-Palmolive Company. Anticalculus oral composition. 4,590,064, Cl. 424-49.000.

Gaffney, Thomas E.; and Baker, Scott C., to Universal-Rundle Corporation. Non-rise faucet assembly. 4,589,629, Cl. 251-288.000.

Gagne, Guy: *See—*
Moulinie, Raoul M.; and Gagne, Guy, 4,589,242, Cl. 52-396.000.

Gain, Thomas, to Panchem GmbH. Process for the preparation of a glucose-free hemoglobin standard. 4,590,164, Cl. 436-15.000.

Gale, Walter W.: *See—*
Bragg, James R.; and Gale, Walter W., 4,589,998, Cl. 252-330.000.

Gamo, Takaharu; Moriwaki, Yoshio; Tagashira, Minoru; and Mitsumata, Tadayasu, to Matsushita Electric Industrial Co., Ltd. Hot water supply unit. 4,589,479, Cl. 165-104.120.

Gardikes, John J., to Ashland Oil, Inc. Phenolic resin-polyisocyanate binder systems. 4,590,229, Cl. 523-143.000.

Gardner, Stephen M.: *See—*
Barto, John J., Jr.; Walsh, Peter M.; Fitzpatrick, Peter R.; Dondero, Richard F.; Demers, Kenneth P.; and Gardner, Stephen M., 4,590,578, Cl. 364-513.000.

Garner, Albert Y.: *See—*
Gabbert, James D.; Garner, Albert Y.; and Hedrick, Ross M., 4,590,243, Cl. 525-184.000.
Gabbert, James D.; Garner, Albert Y.; and Hedrick, Ross M., 4,590,244, Cl. 525-332.300.

Garrod, James H.: *See—*
Timms, Colin T.; and Garrod, James H., 4,589,395, Cl. 123-516.000.

Garth, Geoffrey C.: *See—*
Koledin, Michael J.; and Garth, Geoffrey C., 4,589,407, Cl. 128-87.00R.

Gaset, Antoine; Rigal, Luc; Paillassa, Gilles; Salome , Jean-Paul; and Fleche, Guy, to Roquette Freres. Process for manufacturing 5-hydroxymethylfurfural. 4,590,283, Cl. 549-488.000.

Gaussens, Gilbert: *See—*
Berthet, Jeanne; Blin, Marie-Francoise; and Gaussens, Gilbert, 4,590,068, Cl. 424-81.000.

Gebhardt, James L.; Hanna, James; and Whiten, Douglas, to Mead Corporation, The. Extendible shelf. 4,589,349, Cl. 108-102.000.

Gebruder Linck, Maschinenfabric u. Eisengiesserei "Gatterlinck": *See—*
Traben, Josef, 4,589,456, Cl. 144-3.00P.

General Dynamics Corporation: *See—*
Walker, Ralph M., Jr., 4,589,615, Cl. 244-137.00R.

General Electric Company: *See—*
Anthony, Thomas R., 4,589,190, Cl. 29-571.000.
Bennett, James G., Jr.; and Tungate, Freddie L., 4,590,307, Cl. 568-804.000.
Benson, Michael R.; and Hill, William D., 4,590,472, Cl. 340-870.040.
Brunelle, Daniel J., 4,590,257, Cl. 528-176.000.
Cline, Harvey E., 4,590,130, Cl. 428-446.000.
Gigliotti, Francis X., Jr.; Perocchi, Lee C.; and Frischmann, Peter G., 4,589,471, Cl. 164-463.000.
Glover, Gary H.; and Pelc, Norbert J., 4,590,558, Cl. 364-414.000.
Hofmann, Lee G.; and Dittmar, Charles J., Jr., 4,590,567, Cl. 364-434.000.
Jackson, Melvin R.; Gigliotti, Michael F. X., Jr.; and Yang, Swe-Wong, 4,589,937, Cl. 148-404.000.
Koffel, William K., 4,589,823, Cl. 416-92.000.
Kosky, Philip G.; and Guggenheim, Elizabeth A., 4,590,259, Cl. 528-272.000.
Mendiratta, Ashok K., 4,590,303, Cl. 568-728.000.
Park, Dong-Sil, 4,590,095, Cl. 427-96.000.
Povlick, Thomas P.; and Case, Allen W., Jr., 4,590,356, Cl. 219-124.340.
Relihan, Gary F.; Grass, Joseph J.; and Neitzell, Jerry L., 4,590,603, Cl. 378-108.000.
Siemers, Paul A.; and Krystyniak, Casimir W., 4,590,090, Cl. 427-34.000.

General Motors Corporation: *See—*
Meloche, Kenneth R.; McLeish, James G.; Bach, Douglas R.; and Buchanan, Harry C., Jr., 4,589,676, Cl. 280-707.000.
Moriarty, John K., Jr., 4,590,418, Cl. 323-313.000.
Moriarty, John K., Jr., 4,590,419, Cl. 323-313.000.
Sell, Jeffrey A., 4,590,429, Cl. 324-414.000.

General Signal: *See—*
Wolaver, Dan H., 4,590,602, Cl. 375-120.000.

General Signal Corporation: *See—*
Barker, James E.; and Hadley, James C., 4,589,628, Cl. 251-214.000.

Genicom Corp.: *See—*
Quick, Harry C.; and Read, John M., 4,589,789, Cl. 400-195.000.

Genter, Claude: *See—*
Arnoux, Daniel; Bousquet, Jean; and Genter, Claude, 4,590,421, Cl. 324-62.000.

Gentry, John M.; and Archer, Lee A., to Brand-Rex Company. Wall plate assembly for in-line electrical coupling. 4,589,719, Cl. 339-126.00R.

Georg Schlegel, Firma: *See—*
Schlegel, Eberhard, 4,590,342, Cl. 200-159.00B.

Gerber Scientific Instrument Company, The: *See—*
Pavone, Robert J., 4,589,746, Cl. 354-4.000.

Gerding, Charles C.; and Majors, Harold L., to LTV Steel Company, Inc. Top pour shroud. 4,589,465, Cl. 164-66.100.

Gernez, Alain: *See—*
Maitenaz, Paul; and Gernez, Alain, 4,590,360, Cl. 219-390.000.

Gerry, Martin E. Resistive-capacitive igniter and cable. 4,590,536, Cl. 361-253.000.

Gershenson, Meir, to Sperry Corporation. Aluminum mask anodization with lift-off for patterning Josephson junction devices. 4,589,961, Cl. 204-15.000.

Gerzberg, Levy, to Zoran Corporation; and International Microelectronic Products Corporation. Electrically programmable read only memory. 4,590,589, Cl. 365-100.000.

Gesellschaft fur biotechnologisch Forschung: *See—*
Kula, Maria-Regina; Hummel, Werner; Schutte, Horst; and Leuchtenberger, Wolfgang, 4,590,161, Cl. 435-108.000.

Getty Synthetic Fuels, Inc.: *See—*
Sakoda, Lester M., 4,589,494, Cl. 166-372.000.

Gewerkschaft Eisenhutte Westfalia: *See—*
Beckmann, Klaus; and Becker, Kunibert, 4,589,701, Cl. 299-72.000.

Giancaterini, Gabriel; and Pacifici, Francisco, to Videocolor. Aluminization process of the internal face of the screen of a color television tube. 4,590,092, Cl. 427-68.000.

Gibson, Atholl A. V.: *See—*
Fukushima, Eiichi; Roeder, Stephen B. W.; Assink, Roger A.; and Gibson, Atholl A. V., 4,590,427, Cl. 324-318.000.

Gibson, Russell K. Power squat, weight lifting apparatus. 4,589,658, Cl. 272-134.000.

Giesen, Brigitte: *See—*
Wuhrmann, Juan C.; Seiter, Wolfgang; Giesen, Brigitte; and Schmadel, Edmund, 4,590,237, Cl. 524-480.000.

Gigliotti, Francis X., Jr.; Perocchi, Lee C.; and Frischmann, Peter G., to General Electric Company. Method for rapid solidification of titanium alloys by melt extraction. 4,589,471, Cl. 164-463.000.

Gigliotti, Michael F. X., Jr.: *See—*
Jackson, Melvin R.; Gigliotti, Michael F. X., Jr.; and Yang, Swe-Wong, 4,589,937, Cl. 148-404.000.

Gilbert, William A.: *See—*
Nicholson, John E.; and Gilbert, William A., 4,590,540, Cl. 361-400.000.

Giles, John. Tire bead breaker tool. 4,589,462, Cl. 157-1.170.

Gilles, Pieter; and Schmitt, Jean-Claude, to Baird Corporation. Automatic sampling system. 4,590,165, Cl. 436-49.000.

Gillner, Manfred; Friedrich, Hans G.; Grau, Christian; Crumbach, Richard; Scholl, Heinz; and Hiemenz, Christian, to Saint-Gobain Vitrage. Process and apparatus for producing an optically uniform, transparent coating, layer, film or sheet from a mixture of components. 4,590,030, Cl. 264-331.190.

Gilpatrick, Michael W., to Milliken Research Corporation. Process for heat treating textile substrates to give colored pattern. 4,589,884, Cl. 8-481.000.

Gilson, Jacques; Thomas, Jean M.; Prioretti, Guy; and Henry, Pierre. Process and installation for moulding a refractory lining of a container for liquid metal. 4,589,633, Cl. 266-44.000.

Gin, Vincent M.; and Tharp, Gene E., to Minnesota Mining and Manufacturing Co. Disposable filter for a vacuum cleaner. 4,589,894, Cl. 55-274.000.

Ginns, Haskell, to Indikon Corporation. Detection of top of stroke of piston. 4,589,278, Cl. 73-117.300.

Girot, Pierre; and Boschetti, Egisto, to Pharmuka Laboratoires. Detection of ion concentration in a liquid. 4,590,424, Cl. 324-204.000.

Gjelhaug, Robert B.: *See—*
Knight, Gerard S.; Dreyer, Perry A.; and Gjelhaug, Robert B., 4,589,576, Cl. 222-357.000.

Glaze, Stanley G.: *See—*
Burrage, Robert G.; Glaze, Stanley G.; and Tipton, James, 4,590,549, Cl. 364-131.000.

Glazer, Sam D.; Baumbach, James; Borg, Anita; and Wittels, Emanuel, to Parallel Computers Systems, Inc. Backup fault tolerant computer system. 4,590,554, Cl. 364-200.000.

Glodowski, Robert J.; and Van Slyke, Vernon C., to Armco Inc. Grinding rod and method for production thereof. 4,589,934, Cl. 148-145.000.

Glover, Gary H.; and Pelc, Norbert J., to General Electric Company. Method and apparatus for removing objects from CT images. 4,590,558, Cl. 364-414.000.

Glowny Instytut Gornictwa: *See—*
Barton, Piotr; Krzystolik, Pawel; Sliz, Jan; Dworok, Roman; Lebecki, Kazimierz; and Slotwinski, Ryszard, 4,590,373, Cl. 250-308.000.

Gmoser, Johann: *See—*
Daimer, Wolfgang; Gmoser, Johann; and Schipfer, Rudolf, 4,590,245, Cl. 525-504.000.

GNS Gesellschaft fur Nuklear-Service mbH: *See—*
Baatz, Henning; Rittscher, Dieter; and Lur, Hans-Joachim, 4,590,000, Cl. 252-633.000.

Goff, Stephen P.: *See—*
Chen, Michael S. K.; Goff, Stephen P.; and VanOmmeren, James, 4,589,896, Cl. 62-28.000.

Goggin, John C., to E-Systems, Inc. Frequency synthesizing circuit. 4,590,439, Cl. 331-1.00A.

Gogniat, Paul; and Loth, Eric, to Montres Rado S.A. Method of making part of a watch case. 4,589,886, Cl. 29-179.000.

Goi, Koichi: *See—*
Kokubo, Eiichi; Goi, Koichi; Arikawa, Junichi; Ebihara, Hideyuki; and Chiba, Hiroshi, 4,589,708, Cl. 312-71.000.

Goinga, Ynze D., to Hazemeijer B.V. Active full-wave rectifier detector circuit. 4,590,547, Cl. 363-127.000.

Goldbeck, Heinz; Plassmeier, Horst; and Moller, Klaus, to Durkoppwerke GmbH. Automatic pocket opening sewing machine having a cutting device for producing notching cuts. 4,589,358, Cl. 112-68.000.

Goldner, Erwin P. Gas line dust trap. 4,589,895, Cl. 55-357.000.

Goldstein, Henry: *See—*
Cowles, John M.; Goldstein, Henry; Chicoye, Etzer; and Ting, Patrick L., 4,590,296, Cl. 568-366.000.

Goldstein, Norman P.; Service, Alex D.; and Todt, William H., to Westinghouse Electric Corp. Ion chamber with a flat sensitivity response characteristic. 4,590,401, Cl. 313-93.000.

Golike, Gregory P.: *See—*
Adams, Terry N.; Spurrell, Robert M.; Karsner, Grant G.; Golike, Gregory P.; and Lincoln, James F. L., 4,589,356, Cl. 110-347.000.
Lincoln, James F. L.; Buder, Manfred K.; Brown, Craig A.; Golike, Gregory P.; and Spurrell, Robert M., 4,589,357, Cl. 110-347.000.

Goode, Raun L.: *See—*
Kissinger, Carlos A.; and Goode, Raun L., 4,589,201, Cl. 29-764.000.

Goodell, Paul D.; Huston, Ernest L.; Rudman, Peter S.; and Sandrock, Gary D., to Ergenics, Inc.; and Air Products and Chemicals, Inc. Metal bound and ballasted hydridable pellets. 4,589,919, Cl. 75-251.000.

Goodman, Steven. Television magnification apparatus. 4,589,739, Cl. 350-452.000.

Gopikanth, Mysore L., to Cardiac Pacemakers, Inc. Coating for silver/-silver chloride reference electrode. 4,589,418, Cl. 128-635.000.

Gorgerino, Mario D., to O.E.T. Metalconsult s.r.l. Additive for metallurgic liquids being effective to improve the characteristics of metal or metal alloy articles of manufacture. 4,589,915, Cl. 75-53.000.

Gossard, Arthur C.: *See—*
Capasso, Federico; Gossard, Arthur C.; and Stavola, Michael J., 4,590,507, Cl. 357-28.000.

Goth, George R.; Hansen, Thomas A.; and Villetto, Robert T., Jr., to International Business Machines Corporation. Metal silicide channel stoppers for integrated circuits and method for making the same. 4,589,193, Cl. 29-576.00W.

Goto, Fumio, to Namba Press Works Co. Ltd. Process for making reinforcing layers on inner surfaces of complicated cavities. 4,590,026, Cl. 264-221.000.

Goto, Shigeo: *See—*
Tanaka, Toshihiro; Yoshimi, Keiichi; and Goto, Shigeo, 4,589,941, Cl. 156-140.000.

Goto, Takashi; and Hirayama, Katsuhiko, to Alps Electric Co., Ltd. Printer. 4,590,330, Cl. 178-4.000.

Gotou, Takeo: *See—*
Hamano, Isao; Morishita, Akira; Akae, Yoshifumi; Tanaka, Toshinori; Matsumoto, Kouichi; Gotou, Takeo; and Yabunaka, Kiyoshi, 4,590,385, Cl. 290-38.00E.

Gould, Donald R.: *See—*
Cummings, Kenneth D.; Gould, Donald R.; Gray, Forrest C.; and Pereira, Lawrence W., 4,590,585, Cl. 364-900.000.

Govaert, Johan A., to Baird Corporation. Digital gain adjuster circuit for photomultiplier tubes. 4,590,368, Cl. 250-207.000.

Goyert, Josita M.: *See—*
Burgit, Richard A.; Davis, Newton G.; Goyert, Josita M.; Johnson, Keith, Jr.; Long, Robert A.; and Stachura, Joseph F., 4,589,200, Cl. 29-753.000.

Grace, Henry C.: *See—*
Blackwell, Joseph T.; Daughety, Harold L.; Grace, Henry C.; and Oliver, Ward H., 4,590,292, Cl. 560-124.000.

Grace, Wallace C.; and Boychuk, Walter P. Composite tooth-forming rack and method for making same. 4,589,305, Cl. 76-107.00R.

Graco Inc.: *See—*
Robisch, Herman; and Kroll, Arthur T., 4,589,597, Cl. 239-703.000.

Graco Metal Products, Inc.: *See—*
Saint, David, 4,589,657, Cl. 272-85.000.

Graham, John M. Air brake with collet locked push rod and air supply system. 4,589,704, Cl. 303-6.00M.

Graper, Jane: *See—*
Schwartz, Abraham; Graper, Jane; and Williams, Joel, 4,589,873, Cl. 604-265.000.

Grapha-Holding AG: *See—*
Muller, Hans, 4,589,603, Cl. 242-59.000.

Graphic Laminating Inc.: *See—*
Hannon, Donald F., 4,589,687, Cl. 283-94.000.

Grass, Joseph J.: *See—*
Relihan, Gary F.; Grass, Joseph J.; and Neitzell, Jerry L., 4,590,603, Cl. 378-108.000.

Grassner, Willi, to Henkel Kommanditgesellschaft auf Aktien. Folding box blank. 4,589,589, Cl. 229-52.00B.

Gratsch, Jack M. Combination cloth spreading machine and complementary moving knife. 4,589,644, Cl. 270-31.000.

Grau, Christian: *See—*
Gillner, Manfred; Friedrich, Hans G.; Grau, Christian; Crumbach, Richard; Scholl, Heinz; and Hiemenz, Christian, 4,590,030, Cl. 264-331.190.

Gravis Computer Peripherals Inc.: *See—*
Scott-Jackson, Dennis L.; Russell, Grant N.; and Richards, Eric J., 4,590,339, Cl. 200-6.00A.

Gray, Forrest C.: *See—*
Cummings, Kenneth D.; Gould, Donald R.; Gray, Forrest C.; and Pereira, Lawrence W., 4,590,585, Cl. 364-900.000.

Gray, Kenneth P.: *See—*
Greever, James E.; and Gray, Kenneth P., 4,589,198, Cl. 29-709.000.

Grayhill, Inc.: *See—*
Kikta, Donald D.; and Regnier, Kent E., 4,590,344, Cl. 200-291.000.

Green, David T., to United States Surgical Corporation. Surgical fastener retainer member assembly. 4,589,416, Cl. 128-334.00C.

Green, Gary J.; and Yan, Tsoung Y., to Mobil Oil Corporation. Catalyst for reduction of SO_x emissions from FCC units. 4,589,978, Cl. 208-113.000.

Green, Martin A.; and Blakers, Andrew W., to Unisearch Limited. Manufacture of high efficiency solar cells. 4,589,191, Cl. 29-572.000.

Greever, James E.; and Gray, Kenneth P., to Carrier Corporation. Tube loading apparatus. 4,589,198, Cl. 29-709.000.

Gregg, Randolph M.: *See—*
Stewart, Timothy C.; Ofman, Leo; Blair, Kelvin R.; and Gregg, Randolph M., 4,589,547, Cl. 206-328.000.

Gregory, Reginald: *See—*
Ballantine, James A.; Gregory, Reginald; Purnell, John H.; Thomas, John M.; and Westlake, David J., 4,590,294, Cl. 560-247.000.

Greiner, Tom D.; Guzy, Raymond L.; and Knox, Dick L., to Hughes Tool Company. Subsea well submersible pump installation. 4,589,492, Cl. 166-338.000.

Grenzendorfer, Dietmar: *See—*
Marx, Karl; Offermann, Peter; Reumann, Ralf-Dieter; Magel, Matthias; Frenzel, Bertram; and Grenzendorfer, Dietmar, 4,589,169, Cl. 19-304.000.

Greschner, Johann: *See—*
Behringer, Uwe; Greschner, Johann; and Trumpp, Hans-Joachim, 4,589,952, Cl. 156-628.000.

Greskovics, Paul; and Chivens, Donald R., to Alopex Industries, Inc. Pool cleaner. 4,589,986, Cl. 210-483.000.

Grey, Roger A.; White, John F.; and Beals, Eva M., to Atlantic Richfield Company. Method for producing primary alcohols by catalytic hydrogenation of terminal epoxides. 4,590,313, Cl. 568-907.000.

Griner, Glenn C., to Hoover Universal, Inc. Linearly infinitely variable mechanism. 4,589,301, Cl. 74-586.000.

Grinter, Nigel J., to Imperial Chemical Industries, PLC. Transposable cloning vector. 4,590,162, Cl. 435-172.300.

Gritter, David J.; and O'Neil, Walter K., to Eaton Corporation. EV drivetrain inverter with V/HZ optimization. 4,590,413, Cl. 318-803.000.

Gronvaldt, Jesper, to Dedert Corporation. Heat recovery method and apparatus. 4,589,890, Cl. 55-59.000.

Grossmann, Walter: *See—*
Link, Helmut F.; and Grossmann, Walter, 4,589,311, Cl. 82-2.500.

Grotloh, Karlheinz, to Sulzer Brothers Limited. Pressure medium actuated valve. 4,589,627, Cl. 251-25.000.

Gruenewald, Werner, to Braunschweigische Maschinenbauanstalt. Apparatus for removing liquid from fibrous materials. 4,589,923, Cl. 127-4.000.

Gscheidmeier, Manfred: *See—*
Scheidl, Franz; and Gscheidmeier, Manfred, 4,590,302, Cl. 568-665.000.

GTE Communication Systems Corporation: *See—*
Beeman, Robert H.; and Lind, Paul U., 4,590,600, Cl. 375-99.000.
Beeman, Robert H., 4,590,601, Cl. 375-115.000.
Westby, George R., 4,589,956, Cl. 202-170.000.

GTE Laboratories Incorporated: *See—*
Buhrer, Carl F., 4,589,726, Cl. 350-96.200.
Butler, Scott J.; Regan, Robert J.; and Varallo, Anthony B., 4,590,436, Cl. 330-277.000.
Butler, Scott J.; Regan, Robert J.; and Varallo, Anthony B., 4,590,437, Cl. 330-277.000.

GTE Products Corporation: *See—*
Scherer, Albert R., 4,589,601, Cl. 242-1.000.

Gualchi, Elio: *See—*
Secolo, Nunzio; and Gualchi, Elio, 4,589,177, Cl. 29-159.100.

Guggenheim, Elizabeth A.: *See—*
Kosky, Philip G.; and Guggenheim, Elizabeth A., 4,590,259, Cl. 528-272.000.

Guichard, Francoise: *See—*
Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Prat, Gisele; and Pontagnier, Henri, 4,590,193, Cl. 514-253.000.

Gullers, Per, to Alfa-Laval AB. Centrifugal separator with central sludge discharge. 4,589,865, Cl. 494-26.000.

Gunther, Kurt; Martens, Jurgen; and Schickedanz, Maren, to Degussa Aktiengesellschaft. Thin-layer chromatographic method for the separation of enantiomers. 4,590,167, Cl. 436-162.000.

Gurtler, Franz; and Wimmer, Robert, to Bayerische Motoren Werke AG. Installation for displacing a belt band. 4,589,680, Cl. 280-801.000.

Guterman, Daniel C., to Thomson Components - Mostek Corporation. Nonvolatile MOS memory cell with tunneling element. 4,590,504, Cl. 357-23.110.

Gutierrez, William A.: *See—*
Dinan, John H.; and Gutierrez, William A., 4,589,192, Cl. 29-572.000.

Guttag, Karl M.; and Nussrallah, Steve, to Texas Instruments Incorporated. Security bit for designating the security status of information stored in a nonvolatile memory. 4,590,552, Cl. 364-200.000.

Guzy, Raymond L.: *See—*
Greiner, Tom D.; Guzy, Raymond L.; and Knox, Dick L., 4,589,492, Cl. 166-338.000.

Ha, Jung Y., to Kia Industrial Co., Ltd. Automatic brake control system. 4,590,406, Cl. 315-80.000.

Haaga, John R. Method and system for fragmenting kidney stones. 4,589,415, Cl. 128-328.000.

Haargassner, Reinhard: *See—*
Misera, Erich; Floh, Hubert; and Haargassner, Reinhard, 4,589,468, Cl. 164-418.000.

Haas, Roland: *See—*
Brandenstein, Manfred; Haas, Roland; Herrmann, Gerhard; Dobhan, Herbert; and Hans, Rudiger, 4,589,860, Cl. 474-161.000.

Haber, Stephen B., to Du Pont de Nemours, E. I., and Company. Antiinflammatory and/or analgesic 2,3-diaryl-5-halo thiophenes. 4,590,205, Cl. 514-438.000.

Hacker, Heinz; Ihlein, Walter; Laupenmuhlen, Heinz-Klaus; and Mertens, Willi, to Siemens Aktiengesellschaft. Reaction resins for impregnating and casting large-volume components. 4,590,256, Cl. 528-93.000.

Haddad, Paul R.: *See—*
Alexander, Peter W.; and Haddad, Paul R., 4,589,958, Cl. 204-1.00T.

Hadley, James C.: *See—*
Barker, James E.; and Hadley, James C., 4,589,628, Cl. 251-214.000.

Haga, Takahiro; Toki, Tadaaki; Koyanagi, Toru; Okada, Hiroshi; Yoshida, Kiyomitsu; and Imai, Osamu, to Ishihara Sangyo Kaisha Ltd. Organophosphorus compound and insecticidal, miticidal or nematicidal composition containing it. 4,590,182, Cl. 514-80.000.

Hagen, Helmut; Ziegler, Hans; and Wuerzer, Bruno, to BASF Aktiengesellschaft. Novel 4'(benzisothiazo-5-yloxy)-phenylurea derivatives, their preparation and their use as herbicides. 4,589,910, Cl. 71-90.000.

Hagen, James P.; and Meyer, Walter E. Truck restraining device. 4,589,813, Cl. 414-401.000.

Hagino, Tadao: *See—*
Yoshida, Yutaka; Hirayama, Shozo; Kusunoki, Hiroyuki; Shishido, Yoshio; Matsuo, Kazumasa; Mizumoto, Morihide; Kato, Masahiko; and Hagino, Tadao, 4,589,414, Cl. 128-305.000.

Hahn, Robert. Computer-controlled grinding machine. 4,590,573, Cl. 364-474.000.

Hakugen, Ltd.: *See—*
Takeuchi, Keinosuke, 4,590,111, Cl. 428-67.000.

Halim, Wibara. High-density accommodations system utilizing convertibility from parallel bedding to vertically staggered seating. 4,589,612, Cl. 244-118.600.

Hall, Holland; and Nielson, Richard, to Ilsco of Canada Limited. Flip-top electrical connector. 4,589,722, Cl. 339-272.0UC.

Hall, James T.: *See—*
Rogers, Harvey N., Jr.; and Hall, James T., 4,590,091, Cl. 427-53.100.

Hall, John L.; Shamine, Dennis R.; and Koenig, James P., to Allied Corporation. Fan clutch with replaceable plate carrier member. 4,589,535, Cl. 192-70.120.

Hall, John L.: *See—*
Long-sheng, Ma; Hollberg, Leo; Shirley, Jon H.; and Hall, John L., 4,590,597, Cl. 372-32.000.

Halliburton Company: *See—*
Wray, Gary Q., 4,589,485, Cl. 166-250.000.

Halling, Horace P., to Pressure Science Incorporated. Slip joint assembly for a split ring seal. 4,589,666, Cl. 277-200.000.

Hama, Masaaki: *See—*
Hashimoto, Tadanori; Nakano, Kazuhiko; Hama, Masaaki; and Matsuda, Norio, 4,590,053, Cl. 423-344.000.

Hamano, Isao; Morishita, Akira; Akae, Yoshifumi; Tanaka, Toshinori; Matsumoto, Kouichi; Gotou, Takeo; and Yabunaka, Kiyoshi, to Mitsubishi Denki Kabushiki Kaisha. Automatic starter. 4,590,385, Cl. 290-38.00E.

Hamashima, Toyoji: *See—*
Nio, Satoru; Hamashima, Toyoji; and Sato, Shinobu, 4,590,577, Cl. 364-513.000.

Hamatsuki, Takeshige: *See—*
Fukui, Izumu; Hamatsuki, Takeshige; Yano, Takeshi; Sato, Eiichi; and Inui, Osamu, 4,589,786, Cl. 400-124.000.

Hambling, Robert E.: *See—*
Hilditch, Edward A.; Hambling, Robert E.; Sparks, Colin R.; and Walker, David A., 4,590,208, Cl. 514-500.000.

Hamill, Stephen D.; and Knight, Arthur A. Portable cooking device. 4,589,399, Cl. 126-30.000.

Hamilton, Barbara J.: *See—*
Boyd, Elihu K., 4,589,692, Cl. 292-297.000.

Hamilton, David R.: *See—*
Boyd, Elihu K., 4,589,692, Cl. 292-297.000.

Hamilton, Robert L.: *See—*
Reichard, James E.; and Hamilton, Robert L., 4,589,635, Cl. 266-220.000.

Hamlin, Percy J.: *See*—
Mullins, Michael J.; and Hamlin, Percy J., 4,590,300, Cl. 568-616.000.

Hamprecht, Gerhard: *See*—
Varwig, Juergen; and Hamprecht, Gerhard, 4,590,016, Cl. 260-544.00F.

Hampton, James E., to Sedco, Inc. Slip assembly for subsea template. 4,589,802, Cl. 405-227.000.

Hancock, Louie R., to Westvaco Corporation. Pinch-action suction cup. 4,589,648, Cl. 271-106.000.

Hankinson, Julian E., Jr.: *See*—
Young, William O., Jr.; Hankinson, Julian E., Jr.; and Jennings, Mansel A., 4,589,580, Cl. 226-119.000.

Hanna, James: *See*—
Gebhardt, James L.; Hanna, James; and Whiten, Douglas, 4,589,349, Cl. 108-102.000.

Hannon, Donald F., to Graphic Laminating Inc. Identification card method and apparatus. 4,589,687, Cl. 283-94.000.

Hans, Rudiger: *See*—
Brandenstein, Manfred; Haas, Roland; Herrmann, Gerhard; Dobhan, Herbert; and Hans, Rudiger, 4,589,860, Cl. 474-161.000.

Hansell, Gregory L.: *See*—
Yaniv, Zvi; Bar-on, Yair; Cannella, Vincent D.; and Hansell, Gregory L., 4,589,733, Cl. 350-332.000.

Hansen, Thomas A.: *See*—
Goth, George R.; Hansen, Thomas A.; and Villetto, Robert T., Jr., 4,589,193, Cl. 29-576.00W.

Hanson, Donald O.: *See*—
Sherk, Fred T.; and Hanson, Donald O., 4,589,957, Cl. 203-75.000.

Haque, Yusuf A.; and Takla, Ashraf K., to American Microsystems, Inc. Phase locked loop with high and/or low frequency limit detectors for preventing false lock on harmonics. 4,590,440, Cl. 331-17.000.

Hara, Okitada: *See*—
Hotta, Minoru; Hara, Okitada; and Araki, Toshimitsu, 4,589,799, Cl. 405-196.000.

Harada, Haruo: *See*—
Hatsugai, Satoshi; Kawabata, Yoshiaki; Fujiwara, Akira; Kojima, Hisashi; Harada, Haruo; Kudo, Kesayoshi; and Ohara, Shinya, 4,590,083, Cl. 426-557.000.

Harada, Kaoru; and Shimoyama, Akira, to Fuso Chemical Co., Ltd.; and Harada, Kaoru. Method for producing copoly(amino acid). 4,590,260, Cl. 528-328.000.

Haraguchi, Hiroshi: *See*—
Takasu, Yasuhito; Iwata, Toshiharu; Haraguchi, Hiroshi; and Hosoe, Katsuharu, 4,590,565, Cl. 364-431.080.

Harari, Eliyahou; and Das, Ranendu M., to Honeywell Inc. Electrically erasable programmable read only memory. 4,590,503, Cl. 357-23.500.

Hardin, Philip J. Ink agitator for printing presses. 4,589,337, Cl. 101-363.000.

Harrigan, Michael E.; Rees, James D.; and Deibler, Melvin E., to Xerox Corporation. Two row reduction/enlargement gradient index lens array having square-ended fibers. 4,589,736, Cl. 350-413.000.

Harris, Paul C.: *See*—
Cragle, Linda K.; Harris, Paul C.; Lee, Shih-Yun; Tung, Ker-Kong; and Vodian, Morton A., 4,590,169, Cl. 436-523.000.

Harris, Robert M., Jr., to McKesson Corporation. Bottle and crate for containing liquids. 4,589,560, Cl. 215-1.00C.

Harrison, Cecil P.; and Tittle, Cullen G., to Tennessee Valley Authority. Granulation of crystalline by-product ammonium sulfate. 4,589,904, Cl. 71-61.000.

Harrison, Reginald: *See*—
Colford, Terence H.; and Harrison, Reginald, 4,589,347, Cl. 105-224.100.

Hart, Rebecca A.: *See*—
Bocchi, Curtis J.; Eide, Donald A.; and Hart, Rebecca A., 4,590,511, Cl. 358-21.00R.

Hart, Russell F.: *See*—
Schebler, Bernard J.; and Hart, Russell F., 4,589,436, Cl. 137-115.000.

Hartry, Donald R.: *See*—
Belli, Remo; and Hartry, Donald R., 4,589,323, Cl. 84-411.00R.

Harvey, Andrew C.: *See*—
Doherty, Brian J.; and Harvey, Andrew C., 4,589,484, Cl. 166-179.000.

Hasegawa, Hisashi: *See*—
Ohashi, Ryutaro; Hasegawa, Hisashi; Miyoshi, Masao; Iida, Hajime; Mase, Toshiyuki; Tanaka, Takashi; Funatsu, Tsunemasa; and Nakanishi, Tami, 4,589,261, Cl. 62-73.000.

Hasegawa, Masazumi: *See*—
Arai, Shoji; and Hasegawa, Masazumi, 4,590,223, Cl. 521-118.000.

Hasegawa, Yoshio; Kobori, Takeo; and Fukuda, Kazushige, to Kurosaki Refractoris Co., Ltd.; and Foundation: The Research Institute for Special Inorganic Materials, The. Organosilicon polymer and process for production thereof. 4,590,253, Cl. 528-14.000.

Hashimoto, Shigebumi: *See*—
Sakakibara, Shumpei; Yugari, Yasumi; and Hashimoto, Shigebumi, 4,590,178, Cl. 514-18.000.

Hashimoto, Tadanori; Nakano, Kazuhiko; Hama, Masaaki; and Matsuda, Norio, to Sumitomo Chemical Company, Limited. Method for producing α-form silicon nitride fine powders. 4,590,053, Cl. 423-344.000.

Hashimoto, Tadanori; Nakano, Kazuhiko; and Matsuda, Norio, to Sumitomo Chemical Company, Limited. Abrasive used in magnetic recording medium and production thereof. 4,590,127, Cl. 428-405.000.

Hashimoto, Takatsugu; and Ohashi, Takashi, to Bridgestone Tire Co., Ltd. Low-resilience rubber compositions and foams. 4,590,123, Cl. 428-316.600.

Hassler, Dietrich: *See*—
Breimesser, Fritz; Hassler, Dietrich; Hundt, Eckart; Maderlechner, Gerd; and Trautenberg, Elmar, 4,589,284, Cl. 73-626.000.

Hastem-Muller, Hugo S. Drive shaft for slat conveyor. 4,589,543, Cl. 198-834.000.

Hastings, John D., to Johnson Fishing, Inc. Fishing lure composition. 4,589,223, Cl. 43-42.240.

Hastings, Otis H. Data processing equipment enclosures. 4,589,712, Cl. 312-236.000.

Hatakeyama, Yoshiharu; and Teshima, Kenzo, to Yoshida Industry Co., Ltd. Vanity case. 4,589,429, Cl. 132-79.00R.

Hataoka, Nobuo; and Ichikawa, Akira, to Hitachi, Ltd. Method for production of speech reference templates. 4,590,605, Cl. 381-43.000.

Hatsugai, Satoshi; Kawabata, Yoshiaki; Fujiwara, Akira; Kojima, Hisashi; Harada, Haruo; Kudo, Kesayoshi; and Ohara, Shinya, to Myojo Foods Co., Ltd. Process for producing rapid-cooking noodles. 4,590,083, Cl. 426-557.000.

Hatta, Koichi; and Ikemoto, Yutaka, to Sharp Kabushiki Kaisha. Multi-alarm timepiece with simplified operating means. 4,589,779, Cl. 368-74.000.

Hauni-Werke Korber & Co. KG: *See*—
Uhlig, Uwe, 4,589,232, Cl. 51-168.000.

Havens, Florine P., Richard C. Thompson, executors: *See*—
Havens, Glenn G., deceased, 4,589,595, Cl. 239-271.000.

Havens, Glenn G., deceased (by Havens, Florine P., Richard C. Thompson, executors), to Havens International, Inc. Pressure compensated emitter. 4,589,595, Cl. 239-271.000.

Havens International, Inc.: *See*—
Havens, Glenn G., deceased, 4,589,595, Cl. 239-271.000.

Hawthorne, V. Terrey: *See*—
Holabeck, Gus D.; Mullen, William A.; Smith, Charles M.; and Hawthorne, V. Terrey, 4,589,348, Cl. 105-228.000.

Hay, Robert R.; and Spencer, Paul R., to Hewlett-Packard Company. Nozzle test apparatus and method for thermal ink jet systems. 4,590,482, Cl. 346-1.100.

Hayashi, Keijiro; Awano, Toshimi; and Asai, Shigeru, to Mizuno Corporation. Method for manufacturing an injection-molded foam core ski plate. 4,590,023, Cl. 264-46.500.

Hayashi, Torahiko, to Rheon Automatic Machinery Co., Ltd. Device for forming balls of plastic material. 4,589,833, Cl. 425-306.000.

Hayashi, Yoshiaki; and Takada, Takuzo, to Yoshino Kogyosho Co., Ltd. Blow-molded bottle-shaped container of biaxially oriented polyethylene terephthalate resin and method of molding the same. 4,589,559, Cl. 215-1.00C.

Hayashi, Yoshikazu: *See*—
Iwata, Masayosi; Hayashi, Yoshikazu; and Yokoyama, Tadashi, 4,590,341, Cl. 200-61.540.

Hayashi, Yoshitoki: *See*—
Sugiura, Haruyuki; Hayashi, Yoshitoki; and Matsui, Kazuhiro, 4,589,794, Cl. 403-187.000.

Hayashibara, Toshio: *See*—
Mizoguchi, Hiroaki; Hayashibara, Toshio; Shitara, Tadashi; Katano, Sigeyuki; and Kume, Hideo, 4,589,827, Cl. 417-423.00R.

Hayes, Robert L.: *See*—
Thomas, Samuel J.; Robich, James M.; and Hayes, Robert L., 4,589,275, Cl. 73-40.50R.

Haynes, Stewart: *See*—
Brown, Alfred; Haynes, Stewart; Alves, Gerald W.; and Lim, Frank H., 4,589,486, Cl. 166-252.000.

Hayward, Patrick K. Container with improved disposable pouring spout. 4,589,578, Cl. 222-529.000.

Hazemeijer B.V.: *See*—
Goinga, Ynze D., 4,590,547, Cl. 363-127.000.

Healey, Kevin: *See*—
Chandler, Howard M.; Healey, Kevin; and Hurrell, John G. R., 4,590,157, Cl. 435-7.000.

Hearst, Peter J., to United States of America, Navy. Passivation of steel with aqueous amine solutions preparatory to application of non-aqueous protective coatings. 4,590,100, Cl. 427-327.000.

Heath, Michael C.; and Nelson, Leonard E., to Motorola, Inc. Receiver having reference voltage stabilization circuitry. 4,590,618, Cl. 455-343.000.

Hecht, Sidney M.; Lynn, David G.; and Reddy, Kalakota S., to Wofor AG. Lipoglycosides and process of extracting same. 4,590,264, Cl. 536-18.200.

Heckmann, Walter: *See*—
Horn, Peter; Bunsch, Hellmut; Hesse, Anton; Marx, Matthias; Nissen, Dietmar; and Heckmann, Walter, 4,590,242, Cl. 525-183.000.

Hedrick, Ross M.: *See*—
Gabbert, James D.; Garner, Albert Y.; and Hedrick, Ross M., 4,590,243, Cl. 525-184.000.
Gabbert, James D.; Garner, Albert Y.; and Hedrick, Ross M., 4,590,244, Cl. 525-332.300.

Hehn, Bruce A., to Alpha Enterprises, Inc. Audio cassette package. 4,589,549, Cl. 206-387.000.

Heibel, Helmut: *See*—
Danne, Ulrich W.; and Heibel, Helmut, 4,589,527, Cl. 188-79.5GE.

Heiker, Fred R.; Muller, Lutz; Puls, Walter; and Bischoff, Hilmar, to Bayer Aktiengesellschaft. Medicaments containing amino-cyclitol derivatives. 4,590,179, Cl. 514-25.000.

Heindl, Johann; and Hirzinger, Gerhard, to Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt e.V. Device for programming movements of a robot. 4,589,810, Cl. 414-5.000.

Heinrich, Rudolf: *See*—
Schumacher, Hans; Heinrich, Rudolf; and Marks, Hans-Gunter, 4,589,908, Cl. 71-88.000.

Heinz, Gerhard: *See*—
Zeiner, Hartmut; Fischer, Jurgen; Heinz, Gerhard; Neumann, Peter; Nissen, Dietmar; and Schaefer, Gerhard, 4,590,104, Cl. 427-389.900.

Held, Kurt. Double band press of modular construction. 4,589,948, Cl. 156-555.000.

Helinski, Donald R.; and Ditta, Gary S., to University of California, The Regents of the. Broad host range DNA cloning system for gram-negative bacteria. 4,590,163, Cl. 435-317.000.

Heller, Jorge: *See*—
Saito, Kenichiro; Heller, Jorge; and Skinner, Wilfred A., 4,590,190, Cl. 514-221.000.

Hellon, Keith, to MacLean-Fogg Company. Container for handling, transportation and storage of microscope slides. 4,589,551, Cl. 206-456.000.

Hellwig, Rolf; Seidensticker, Jens; and Karius, Klaus D., to Rheinmetall GmbH. Sensor carrier. 4,589,340, Cl. 102-293.000.

Hemmeter, George T. Thermal activated penile prosthesis. 4,589,405, Cl. 128-79.000.

Henkel Kommanditgesellschaft auf Aktien: *See*—
Erwied, Werner; Wegemund, Bernd; Wedl, Peter; and Worschech, Kurt, 4,590,233, Cl. 524-357.000.
Grassner, Willi, 4,589,589, Cl. 229-52.00B.
Wuhrmann, Juan C.; Seiter, Wolfgang; Giesen, Brigitte; and Schmadel, Edmund, 4,590,237, Cl. 524-480.000.

Henrick, Clive A., to Sandoz Ltd. Pest control agents. 4,590,282, Cl. 549-453.000.

Henry, Pierre: *See*—
Gilson, Jacques; Thomas, Jean M.; Prioretti, Guy; and Henry, Pierre, 4,589,633, Cl. 266-44.000.

Hensley, Billy R.: *See*—
Olson, Wayne L.; and Hensley, Billy R., 4,589,523, Cl. 182-234.000.

Hensley, Raymond E.: *See*—
Pate, Ronald C.; and Hensley, Raymond E., 4,589,398, Cl. 123-596.000.

Her Majesty the Queen in right of the Province of Alberta, as represented by the Minister of Energy and Natural Resources: *See*—
Porter, Andrew W.; and Bach, Lars, 4,589,288, Cl. 73-852.000.

Hercules Incorporated: *See*—
Byrne, Brian; and Lawter, Louise M. L., 4,590,284, Cl. 549-477.000.

Herman Rynveld's Son Corporation: *See*—
Shaffer, Earl R., 4,590,105, Cl. 428-8.000.

Herrmann, Gerhard: *See*—
Brandenstein, Manfred; Haas, Roland; Herrmann, Gerhard; Dobhan, Herbert; and Hans, Rudiger, 4,589,860, Cl. 474-161.000.

Herzog, Heinz, to Oscar Weil GmbH & Co. KG. Fiber wool padding, and method of manufacturing same. 4,590,113, Cl. 428-92.000.

Hesse, Anton: *See*—
Horn, Peter; Bunsch, Hellmut; Hesse, Anton; Marx, Matthias; Nissen, Dietmar; and Heckmann, Walter, 4,590,242, Cl. 525-183.000.

Hetzner, Randall H.: *See*—
McDonald, Theodore R.; and Hetzner, Randall H., 4,590,364, Cl. 235-98.00C.

Hewlett-Packard Company: *See*—
Hay, Robert R.; and Spencer, Paul R., 4,590,482, Cl. 346-1.100.
Lawton, Robert J., 4,589,667, Cl. 279-2.00A.

Hicks, Bruce W., to Rio Linda Chemical Co., Inc. Process for the generation of chlorine dioxide. 4,590,057, Cl. 423-477.000.

Hicks, Samuel: *See*—
Nunemaker, Joseph P.; and Hicks, Samuel, 4,590,331, Cl. 179-5.00R.

Hidvegi, Valeria, to Kozponti Valto- es Hitelbank Rt. Innovecios Alap. Construction set, preferably a toy set. 4,589,853, Cl. 446-123.000.

Hiemenz, Christian: *See*—
Gillner, Manfred; Friedrich, Hans G.; Grau, Christian; Crumbach, Richard; Scholl, Heinz; and Hiemenz, Christian, 4,590,030, Cl. 264-331.190.

Hilditch, Edward A.; Hambling, Robert E.; Sparks, Colin R.; and Walker, David A., to Cuprinol Limited. Anti-fungal compositions employing metal salts of carboxylic acids. 4,590,208, Cl. 514-500.000.

Hill, Robert W., to Morton Thiokol, Inc. Gas bag inflators. 4,590,041, Cl. 422-165.000.

Hill, William D.: *See*—
Benson, Michael R.; and Hill, William D., 4,590,472, Cl. 340-870.040.

Hiraga, Kentaro; and Saji, Yoshiaki, to Takeda Chemical Industries, Ltd. Condensed pyrrolinone derivatives, their production and use. 4,590,189, Cl. 514-212.000.

Hirai, Hiroyuki; Yabuki, Yoshiharu; Takeuchi, Masashi; and Aono, Toshiaki, to Fuji Photo Film Co., Ltd. Heat developable color photographic light-sensitive material containing sulfonamide. 4,590,154, Cl. 430-559.000.

Hirakawa, Motomu: *See*—
Nakamura, Morio; Obayashi, Shigeji; Takemori, Shinichi; Tanaka, Hitoshi; and Hirakawa, Motomu, 4,590,227, Cl. 523-130.000.

Hirakawa, Noboru; and Tsujide, Tohru, to Nippon Electric Co., Ltd. MOS static ram with capacitively loaded gates to prevent alpha soft errors. 4,590,508, Cl. 357-41.000.

Hirano, Hiroyuki: *See*—
Abo, Keiju; Kumura, Haruyoshi; Hirano, Hiroyuki; Tanaka, Yoshikazu; Yamamuro, Sigeaki; and Morimoto, Yoshiro, 4,590,561, Cl. 364-424.100.

Hirano, Shin-ichi; and Naka, Shigeharu, to Toshiba Tungaloy Co., Ltd. Method for preparing sintered body containing cubic boron nitride and method for preparing cubic boron nitride. 4,590,034, Cl. 419-13.000.

Hirano, Takashi, to Yamato Scale Company, Ltd. Combination weighing system. 4,589,506, Cl. 177-25.000.

Hirayama, Katsuhiko: *See*—
Goto, Takashi; and Hirayama, Katsuhiko, 4,590,330, Cl. 178-4.000.

Hirayama, Shozo: *See*—
Yoshida, Yutaka; Hirayama, Shozo; Kusunoki, Hiroyuki; Shishido, Yoshio; Matsuo, Kazumasa; Mizumoto, Morihide; Kato, Masahiko; and Hagino, Tadao, 4,589,414, Cl. 128-305.000.

Hirosawa, Yasuhisa: *See*—
Nikaido, Akira; Machida, Takayasu; Hirosawa, Yasuhisa; and Nakajima, Fumio, 4,590,529, Cl. 360-106.000.

Hirose, Masanori: *See*—
Ishikawa, Seiji; and Hirose, Masanori, 4,589,593, Cl. 236-94.000.

Hirzinger, Gerhard: *See*—
Heindl, Johann; and Hirzinger, Gerhard, 4,589,810, Cl. 414-5.000.

Hisatake, Masayuki: *See*—
Noguchi, Akio; Moriguchi, Haruhiko; Inui, Toshiharu; and Hisatake, Masayuki, 4,590,487, Cl. 346-76.0PH.

Hiscock, Willis E.; Cassidy, Robert T.; and Werner, Robert G., to Union Carbide Corporation. Pressure swing adsorption process. 4,589,888, Cl. 55-26.000.

Hitachi, Ltd.: *See*—
Fukushima, Isao; Kobori, Yasunori; and Nishijima, Hideo, 4,590,438, Cl. 330-300.000.
Hataoka, Nobuo; and Ichikawa, Akira, 4,590,605, Cl. 381-43.000.
Hori, Yasuro; and Abe, Nobuo, 4,590,491, Cl. 346-76.0PH.
Ido, Satoshi; Fujinami, Minpei; Kato, Yasuo; Sakitani, Yoshio; and Ozasa, Susumu, 4,589,773, Cl. 356-371.000.
Itoh, Kiyoo; and Hori, Ryoichi, 4,590,588, Cl. 365-51.000.
Kawakubo, Yukio; Sugawara, Hiroyuki; Kuwabara, Kouji; Shirakura, Toshiharu; Takemori, Satoshi; and Sasaki, Kouji, 4,590,599, Cl. 372-87.000.
Kosuge, Tokuo; and Karino, Kimiji, 4,589,389, Cl. 123-326.000.
Kumagai, Yozo, 4,589,930, Cl. 148-11.50C.
Mizoguchi, Hiroaki; Hayashibara, Toshio; Shitara, Tadashi; Katano, Sigeyuki; and Kume, Hideo, 4,589,827, Cl. 417-423.00R.
Nagao, Masaji, 4,589,262, Cl. 62-141.000.
Okamoto, Hiroo; Kobayashi, Masaharu; Hoshino, Takashi; and Nishida, Masami, 4,590,524, Cl. 360-65.000.
Sugihara, Isao; and Ikegami, Tsukasa, 4,590,346, Cl. 219-10.430.
Tadokoro, Hiroyuki; and Akahori, Kenichi, 4,589,764, Cl. 355-14.00R.
Takayama, Teruo, 4,589,381, Cl. 123-52.00M.
Tsumura, Makoto; and Takeuchi, Ryozo, 4,590,489, Cl. 346-76.0PH.

Hitachi Zosen Corporation: *See*—
Ueda, Jitsuhiko; Tomono, Yutaka; and Tanaka, Kazuhiko, 4,590,035, Cl. 420-449.000.

Hitchiner Manufacturing Co., Inc.: *See*—
Chandley, George D.; and Thomas, Eugene W., 4,589,466, Cl. 164-119.000.

Hobes, John: *See*—
Morguet, Hermann; Hobes, John; Spaleck, Walter; and Payer, Wolfgang, 4,590,247, Cl. 526-124.000.

Hock, Franz: *See*—
Konz, Elmar; Hock, Franz; Kaiser, Joachim; and Kruse, Hansjorg, 4,590,273, Cl. 544-363.000.

Hodgen, Gary D.; Jones, Howard W., Jr.; and Jones, Georgeanna S., to SErono Laboratories, Inc. Method of in vitro fertilization. 4,589,402, Cl. 128-1.00R.

Hodges, William D., to Machines Chambon S.A. Cylinder for a rotary web processing machine. 4,589,863, Cl. 493-471.000.

Hodgkiss, Douglas H.: *See*—
Baldwin, David R.; and Hodgkiss, Douglas H., 4,590,559, Cl. 364-414.000.

Hoechst Aktiengesellschaft: *See*—
Erckel, Rudiger; Franz, Raimund; Woernle, Rolf; and Riehm, Theodor, 4,589,924, Cl. 127-37.000.
Hunger, Klaus; and Rieper, Wolfgang, 4,589,921, Cl. 106-288.00Q.
Konz, Elmar; Hock, Franz; Kaiser, Joachim; and Kruse, Hansjorg, 4,590,273, Cl. 544-363.000.
Lal, Bansi; Dohadwalla, Alihussein N.; Aroskar, Vijay A.; Dadkar, Nandkumar K.; Dornauer, Horst; Mascarenhas, Julius; and deSouza, Noel J., 4,590,197, Cl. 514-267.000.
Leupold, Ernst I.; Schmidt, Hans-Joachim; and Wunder, Friedrich, 4,590,217, Cl. 518-716.000.
Opitz, Konrad, 4,589,885, Cl. 8-527.000.
Preisler, Eberhard; Debrodt, Heiner; and Lieberoth, Dieter, 4,589,960, Cl. 204-37.100.
Rieck, Hans-Peter; Kalz, Hans-Jurgen; May, Adolf; Quack, Jochen M.; and Bucking, Hans-Walter, 4,589,988, Cl. 252-8.800.
Scheidl, Franz; and Gscheidmeier, Manfred, 4,590,302, Cl. 568-665.000.
Scheler, Siegfried, 4,590,143, Cl. 430-163.000.
Scheunemann, Karl-Heinz; Mencke, Burkhard; Blumbach, Jurgen; Durckheimer, Walter; and Fleischmann, Klaus, 4,590,267, Cl. 544-27.000.

Schumacher, Hans; Heinrich, Rudolf; and Marks, Hans-Gunter, 4,589,908, Cl. 71-88.000.
Spielmann, Werner; and Schaeffer, Georg, 4,590,295, Cl. 562-478.000.
Hoek, Arend; Post, Martin F. M.; and Minderhoud, Johannes K., to Shell Oil Company. Catalyst for dimethyl ether synthesis and a process for its preparation. 4,590,176, Cl. 502-307.000.
Hoeks, Gerardus P. F.; and Tak, Marinus G. A., to U.S. Philips Corporation. Bivalent europium-activated barium aluminate phosphor and low mercury vapor discharge lamp provided with a phosphor. 4,590,405, Cl. 313-486.000.
Hoenigs, Michael; and Reuschenbach, Hermann, to Autoflug GmbH. Central belt lock, particularly for a parachute harness. 4,589,172, Cl. 24-602.000.
Hoffmann-La Roche Inc.: *See*—
Kompis, Ivan; Locher, Rita; and Maag, Hans, 4,590,270, Cl. 544-320.000.
Hofmann, Karl: *See*—
Stumpp, Gerhard; Hofmann, Karl; Treiber, Jurgen; and Wellein, Horst, 4,589,596, Cl. 239-397.500.
Hofmann, Lee G.; and Dittmar, Charles J., Jr., to General Electric Company. Large angle, gravity compensated, bank-to-turn pursuit controller. 4,590,567, Cl. 364-434.000.
Hofmann, Manfred; and Klockner, Karl-Heinz, to Metzeler Kautschuk GmbH. Decoupling diaphragm for two-chamber engine mounts. 4,589,638, Cl. 267-8.00R.
Hohlfeld, Ronald W., to Dow Chemical Company, The. Polymer blends compatibilized with reactive polymers extended with miscible nonreactive polymers. 4,590,241, Cl. 525-132.000.
Holabeck, Gus D.; Mullen, William A.; Smith, Charles M.; and Hawthorne, V. Terrey, to Portland General Electric Company. Retrofitted railway car and method of producing same. 4,589,348, Cl. 105-228.000.
Hollberg, Leo: *See*—
Long-sheng, Ma; Hollberg, Leo; Shirley, Jon H.; and Hall, John L., 4,590,597, Cl. 372-32.000.
Hollingsworth, James A. Mail sorting apparatus and method. 4,589,555, Cl. 209-703.000.
Hollister Incorporated: *See*—
Riedel, Kenneth E.; and Doerschner, David L., 4,589,874, Cl. 604-349.000.
Schneider, Barry L., 4,589,185, Cl. 29-432.000.
Holmberg Company, The: *See*—
Holmberg, Thomas A., 4,590,109, Cl. 428-40.000.
Holmberg, Thomas A., to Holmberg Company, The. Pad of paper sheets with pressure-sensitive attachment edge portion and method of making the same. 4,590,109, Cl. 428-40.000.
Holmstrand, Rune H., to AB Holmstrands Platindustri. Method and compact machine for treating printed circuit cards. 4,589,926, Cl. 134-6.000.
Holtman, Dennis C., to Personal Products Company. Stabilized absorbent structure containing thermoplastic fibers. 4,590,114, Cl. 428-171.000.
Holvoet, Marcel, to Beghin-Say S.A.; and Drouzas, Nicolas. Process for disintegrating and reconstituting a pad of fibers. 4,589,166, Cl. 19-82.000.
Honda Giken Kogyo K.K.: *See*—
Ishikawa, Yoshikazu; and Kiuchi, Takeo, 4,590,564, Cl. 364-431.070.
Wazaki, Yoshio; Koike, Akihiko; and Koike, Yuzuru, 4,589,390, Cl. 123-339.000.
Honda Giken Kogyo Kabushiki Kaisha: *See*—
Amano, Akira; and Sasaki, Kazuhiko, 4,589,251, Cl. 56-202.000.
Asano, Kajio; Sato, Toshihiko; Oda, Haruo; Abe, Yasuaki; and Watanabe, Yoshitaka, 4,589,184, Cl. 29-430.000.
Ashikawa, Noboru; Friedrich, Karl; and Lanzer, Heribert, 4,589,304, Cl. 74-701.000.
Inoue, Takeshi; Saito, Hiroyuki; Takewaka, Tomoyuki; and Funabashi, Hiroshi, 4,589,516, Cl. 181-256.000.
Miura, Seishi; and Tsukui, Takaaki, 4,589,387, Cl. 123-198.00F.
Nishikawa, Masao; Sakurai, Yoshimi; Aoki, Takashi; and Sato, Yoichi, 4,589,537, Cl. 192-0.052.
Ohtaki, Keizaburo; Niikawa, Ryo; and Kondou, Masahide, 4,589,199, Cl. 29-714.000.
Sato, Osamu; and Yamaguchi, Kazuo, 4,589,296, Cl. 74-411.000.
Tsuboi, Masaharu, 4,589,382, Cl. 123-90.310.
Yamaguchi, Ken, 4,589,512, Cl. 180-229.000.
Yonemura, Shigehiro; Umino, Hiroshi; Kume, Masao; Abe, Mitsuo; and Miyatake, Satoshi, 4,589,230, Cl. 51-95.0GH.
Honda, Hidemasa: *See*—
Yamada, Yasuhiro; Imamura, Takeshi; Honda, Hidemasa; Sawaki, Toru; and Sasaki, Hideharu, 4,590,055, Cl. 423-447.400.
Honda, Mikio, to Royal Biken Company, Ltd. Eyelash permanent curl setting rod. 4,589,432, Cl. 132-88.700.
Hone, Norbert: *See*—
Rosenkranz, Otto; Horwege, Claus; and Hone, Norbert, 4,590,028, Cl. 264-154.000.
Honeywell Inc.: *See*—
Bocchi, Curtis J.; Eide, Donald A.; and Hart, Rebecca A., 4,590,511, Cl. 358-21.00R.
Harari, Eliyahou; and Das, Ranendu M., 4,590,503, Cl. 357-23.500.
O'Connor, Donald F.; and Zansky, Zoltan, 4,590,395, Cl. 307-570.000.
Vu, Tho T., 4,590,392, Cl. 307-446.000.
Honjo, Masahiro; Tomita, Masao; and Kobayashi, Masaaki, to Matsushita Electric Industrial Co., Ltd. Control of auto-tracking in tracking-error correcting system of video recording/reproducing apparatus. 4,590,523, Cl. 360-10.300.
Honjo, Seiichiro: *See*—
Yoshizawa, Hideo; Nushi, Masaaki; Sakurai, Kaoru; Usui, Hirotaro; Iida, Naohiro; Tanaka, Togo; and Honjo, Seiichiro, 4,589,901, Cl. 65-107.000.
Hoover Universal, Inc.: *See*—
Griner, Glenn C., 4,589,301, Cl. 74-586.000.
Hoover, William A.; and Payne, Fred E. Motorized wheelbarrow. 4,589,508, Cl. 180-19.100.
Hopman, Nicholas C.: *See*—
Karim, Frank; Frank, Howard L.; and Hopman, Nicholas C., 4,589,401, Cl. 123-479.000.
Hoppe, Lutz: *See*—
Luhmann, Erhard; Hoppe, Lutz; and Szablikowski, Klaus, 4,590,019, Cl. 264-3.400.
Horak, Josef; and Kassegger, Friedrich, to Veitscher Magnesitwerke-Actien-Gesellschaft. Checkerwork in horizontal chamber of a regeneratively fired furnace. 4,589,474, Cl. 165-9.100.
Horch, Frank; Brockmann, Hermann; and Fuchs, Hans-Georg, to Phoenix Aktiengesellschaft. Mold for producing T-shaped rubber hoses. 4,589,623, Cl. 249-83.000.
Hori, Ryoichi: *See*—
Itoh, Kiyoo; and Hori, Ryoichi, 4,590,588, Cl. 365-51.000.
Hori, Yasuro; and Abe, Nobuo, to Hitachi, Ltd. Thermal transfer printer. 4,590,491, Cl. 346-76.0PH.
Horie, Toshiki: *See*—
Naohara, Junsuke; Horie, Toshiki; and Kino, Toru, 4,589,845, Cl. 432-239.000.
Horiguchi, Hiroshi: *See*—
Yoshida, Katsuhiro; and Horiguchi, Hiroshi, 4,590,387, Cl. 307-64.000.
Horihawa, Yoshio: *See*—
Kimura, Akio; and Horihawa, Yoshio, 4,589,744, Cl. 350-566.000.
Horikawa, Kazuo, to Fuji Photo Film Co., Ltd. Method of detecting sensitivities of photomultipliers. 4,590,369, Cl. 250-252.100.
Horlein, Ulrich: *See*—
Boshagen, Horst; Horlein, Ulrich; Reinhardt, Gerd; Seuter, Friedel; and Perzborn, Elisabeth, 4,590,291, Cl. 560-64.000.
Horn, Peter; Bunsch, Hellmut; Hesse, Anton; Marx, Matthias; Nissen, Dietmar; and Heckmann, Walter, to BASF Aktiengesellschaft. Production of low-shrinkage nylon moldings. 4,590,242, Cl. 525-183.000.
Horn, Robert E.: *See*—
Jacobs, Harold, deceased; and Horn, Robert E., 4,590,441, Cl. 331-107.0DP.
Horwege, Claus: *See*—
Rosenkranz, Otto; Horwege, Claus; and Hone, Norbert, 4,590,028, Cl. 264-154.000.
Hoshino, Seiji: *See*—
Ozawa, Hideaki; Hoshino, Seiji; and Nagashima, Yoshimitu, 4,589,646, Cl. 271-4.000.
Hoshino, Takashi: *See*—
Okamoto, Hiroo; Kobayashi, Masaharu; Hoshino, Takashi; and Nishida, Masami, 4,590,524, Cl. 360-65.000.
Hosoda, Keizo: *See*—
Sugiyama, Hiroshi; Hosoda, Keizo; Okada, Masanori; Iwane, Yoshitaka; and Murakami, Yasushi, 4,590,198, Cl. 514-336.000.
Hosoe, Katsuharu: *See*—
Takasu, Yasuhito; Iwata, Toshiharu; Haraguchi, Hiroshi; and Hosoe, Katsuharu, 4,590,565, Cl. 364-431.080.
Hostetler, Eldon; and Hostetler, Robert D., to Ziggity Systems, Inc. Watering device for fowl and small animals. 4,589,373, Cl. 119-72.500.
Hostetler, Robert D.: *See*—
Hostetler, Eldon; and Hostetler, Robert D., 4,589,373, Cl. 119-72.500.
Hotta, Minoru; Hara, Okitada; and Araki, Toshimitsu, to Ishikawajima-Harima Jukogyo Kabushiki Kaisha; and Shipbuilding Research Association, The. Device for locking platform of offshore structure. 4,589,799, Cl. 405-196.000.
Hour, Jiin Y.: *See*—
Liu, Yih H.; and Hour, Jiin Y., 4,589,214, Cl. 33-531.000.
Houtz, Timothy W.; and Lovendusky, Charles M., to Du Pont de Nemours, E. I., and Company. Terminal pin strip separator. 4,589,188, Cl. 29-566.200.
Hoya Corporation: *See*—
Kawai, Hisao, 4,590,128, Cl. 428-411.100.
Hriscisce, Frank: *See*—
Wei, You C.; Cherukuri, Subraman R.; Hriscisce, Frank; Piccolo, Dominic J.; and Bilka, Kenneth P., 4,590,075, Cl. 426-5.000.
Hsu, Joseph C.; Vought, Donald W.; and Walbrun, George H., to American Can Company. Heat resistant heat shrinkable films. 4,590,106, Cl. 428-35.000.
Hsu, Ting-Ih; and Simonutti, Mario D., to TRW Inc. Radial waveguide power divider/combiner. 4,590,446, Cl. 333-125.000.
Huang, Chialang: *See*—
Townsend, Palmer W.; Huang, Chialang; and Vernice, Gerald G., 4,590,310, Cl. 568-842.000.
Hubbard, James R.: *See*—
Bedell, John R.; Friedmann, Paul G.; Kushnick, Julian H.; Rosenthal, Eli; Hubbard, James R.; and Zingler, Christian J., 4,589,470, Cl. 164-463.000.
Hubbard, Lloyd C.: *See*—
Clausen, Earl W.; and Hubbard, Lloyd C., 4,589,822, Cl. 415-170.00A.

Huber, Johann, to Knorr-Bremse AG. Release device for multiple release compressed air brakes of railborne vehicles. 4,589,705, Cl. 303-36.000.

Hudecek, Carl J., to Owens-Illinois, Inc. Sealing glass. 4,589,899, Cl. 65-33.000.

Huebner, James A.: *See*—
Weatherby, Robert G.; and Stein, W. Fred, 4,589,163, Cl. 16-124.000.

Huffman, William J.: *See*—
Allen, Billy R.; Huffman, William J.; and Nack, Herman, 4,589,927, Cl. 134-25.100.

Hughes Aircraft Company: *See*—
Rogers, Harvey N., Jr.; and Hall, James T., 4,590,091, Cl. 427-53.100.
Sashital, Sanat K., 4,589,737, Cl. 350-356.000.

Hughes Tool Company: *See*—
Greiner, Tom D.; Guzy, Raymond L.; and Knox, Dick L., 4,589,492, Cl. 166-338.000.
Johnson, Horace A.; and Smith, Roger, Jr., 4,589,503, Cl. 175-113.000.
Regan, A. Michael, 4,589,689, Cl. 285-24.000.

Hulting, Thomas S., Jr., to Caterpillar Tractor Co. Flexible positioner. 4,589,179, Cl. 29-256.000.

Hummel, Werner: *See*—
Kula, Maria-Regina; Hummel, Werner; Schutte, Horst; and Leuchtenberger, Wolfgang, 4,590,161, Cl. 435-108.000.

Hund, Franz: *See*—
Brunn, Horst; Niggemann, Johannes; Kohler, Peter; and Hund, Franz, 4,589,906, Cl. 71-80.000.

Hundertmark, James M., to Brunswick Corp. Pressure-vacuum aided valve. 4,589,378, Cl. 123-41.020.

Hundt, Eckart: *See*—
Breimesser, Fritz; Hassler, Dietrich; Hundt, Eckart; Maderlechner, Gerd; and Trautenberg, Elmar, 4,589,284, Cl. 73-626.000.

Hung, Peter: *See*—
De Luca, Paul V.; and Hung, Peter, 4,590,335, Cl. 179-175.000.

Hunger, Klaus; and Rieper, Wolfgang, to Hoechst Aktiengesellschaft. Process for improving the application properties of pigment yellow 13. 4,589,921, Cl. 106-288.00Q.

Hunt, Ronald E.; and Whitehead, Verlon E., to International Business Machines Corporation. Ergonomic monitor stand. 4,589,621, Cl. 248-586.000.

Hunter Automated Machinery Corporation: *See*—
Hunter, William A., 4,589,467, Cl. 164-326.000.

Hunter, Danny P. Vehicle mounted fire escape chute. 4,589,519, Cl. 182-48.000.

Hunter, William A., to Hunter Automated Machinery Corporation. Mold handling system. 4,589,467, Cl. 164-326.000.

Hurlemann, Ernst: *See*—
Muller, Kurt; Kalt, Paul; Steiner, Pirmin; and Hurlemann, Ernst, 4,589,325, Cl. 89-33.020.

Hurni, Hans, to Matisa Materiel Industriel S.A. Rail maintenance machine the chassis of which is equipped with a device for lifting and shifting a railway track. 4,589,343, Cl. 104-7.00B.

Hurrell, John G. R.: *See*—
Chandler, Howard M.; Healey, Kevin; and Hurrell, John G. R., 4,590,157, Cl. 435-7.000.

Husky Injection Molding Systems Ltd.: *See*—
Schad, Robert D., 4,589,840, Cl. 425-556.000.

Hussmann Corporation: *See*—
DiCarlo, Leonard J.; Ares, Roland A.; and Norton, Robert O., 4,589,263, Cl. 62-193.000.

Huston, Ernest L.: *See*—
Goodell, Paul D.; Huston, Ernest L.; Rudman, Peter S.; and Sandrock, Gary D., 4,589,919, Cl. 75-251.000.

Hutchinson, Francis G.: *See*—
Chantler, Eric N.; Hutchinson, Francis G.; and Sharman, Deborah A., 4,590,070, Cl. 424-78.000.

Hutson, Roy C. Apparatus for connecting a hydraulically actuated tool to a control valve. 4,589,272, Cl. 72-453.160.

Hutter, Donald J. Adjustable support legs. 4,589,622, Cl. 248-649.000.

Hydrino AB: *See*—
Zettergren, Ted, 4,590,454, Cl. 338-128.000.

Hynd, John G. S.: *See*—
Salter, Martin de G.; and Hynd, John G. S., 4,589,502, Cl. 175-102.000.

Ichihashi, Hiroo; Toganoh, Shigeo; and Matsufuji, Yohji, to Canon Kabushiki Kaisha. Multicolor recording apparatus. 4,590,494, Cl. 346-140.00R.

Ichikawa, Akira: *See*—
Hataoka, Nobuo; and Ichikawa, Akira, 4,590,605, Cl. 381-43.000.

ICI Australia Limited: *See*—
O'Sullivan, Brendan W.; Leggett, Leo J.; and Melvin, Maxwell V., 4,589,370, Cl. 119-4.000.

Ido, Satoshi; Fujinami, Minpei; Kato, Yasuo; Sakitani, Yoshio; and Ozasa, Susumu, to Nippon Telegraph & Telephone Public Corporation; and Hitachi, Ltd. Position detecting system. 4,589,773, Cl. 356-371.000.

Igaki, Tetsuo: *See*—
Yahagi, Masakichi; Igaki, Tetsuo; Yosinaka, Sinzi; Morita, Kousaku; Saito, Morikuni; and Kinoshita, Kimiaki, 4,590,498, Cl. 346-208.000.

Ihara, Shinji: *See*—
Iwasaki, Juzaemon; and Ihara, Shinji, 4,589,208, Cl. 30-376.000.

Ihlein, Walter: *See*—
Hacker, Heinz; Ihlein, Walter; Laupenmuhlen, Heinz-Klaus; and Mertens, Willi, 4,590,256, Cl. 528-93.000.

Iida, Hajime: *See*—
Ohashi, Ryutaro; Hasegawa, Hisashi; Miyoshi, Masao; Iida, Hajime; Mase, Toshiyuki; Tanaka, Takashi; Funatsu, Tsunemasa; and Nakanishi, Tami, 4,589,261, Cl. 62-73.000.

Iida, Naohiro: *See*—
Yoshizawa, Hideo; Nushi, Masaaki; Sakurai, Kaoru; Usui, Hirotaro; Iida, Naohiro; Tanaka, Togo; and Honjo, Seiichiro, 4,589,901, Cl. 65-107.000.

Iimori, Akiro, to Tokyo Shibaura Denki Kabushiki Kaisha. Image forming apparatus. 4,589,760, Cl. 355-8.000.

Iiyama, Katuaki: *See*—
Kamada, Keiichi; Iiyama, Katuaki; Yano, Yasushi; and Itoh, Isao, 4,590,230, Cl. 524-77.000.

Ijichi, Sadayoshi, to Alps Electric Co., Ltd. Electronic tuner having selectable band sections appropriately biased to mixer/amplifier. 4,590,612, Cl. 455-190.000.

Ikeda, Yoshinori; and Matsuoka, Nobuo, to Canon Kabushiki Kaisha. Color image processing apparatus. 4,590,514, Cl. 358-75.000.

Ikegai Tekko Kabushiki Kaisha: *See*—
Sawada, Takehiko; Miyazawa, Masanori; and Kikuchi, Noriyuki, 4,590,081, Cl. 426-448.000.

Ikegami, Tsukasa: *See*—
Sugihara, Isao; and Ikegami, Tsukasa, 4,590,346, Cl. 219-10.430.

Ikemoto, Yutaka: *See*—
Hatta, Koichi; and Ikemoto, Yutaka, 4,589,779, Cl. 368-74.000.

Ilsco of Canada Limited: *See*—
Hall, Holland; and Nielson, Richard, 4,589,722, Cl. 339-272.0UC.

Imai, Eiichi; and Urawa, Motoo, to Canon Kabushiki Kaisha. Three color toner kit and method of use. 4,590,139, Cl. 430-45.000.

Imai, Masafumi; Yamamoto, Tadashi; Furuhashi, Hiroyuki; Ueno, Hiroshi; and Inaba, Naomi, to Toa Nenryo Kogyo Kabushiki Kaisha. Catalyst component for polymerization of olefins. 4,590,325, Cl. 585-512.000.

Imai, Osamu: *See*—
Haga, Takahiro; Toki, Tadaaki; Koyanagi, Toru; Okada, Hiroshi; Yoshida, Kiyomitsu; and Imai, Osamu, 4,590,182, Cl. 514-80.000.

Imai, Shigeru, to Yoshida Kogyo K. K. Method and apparatus for forming a space section in a pair of continuous concealed-slide-fastener stringers. 4,589,182, Cl. 29-410.000.

Imaizumi, Mamoru; and Shibata, Kiyoshi, to Brother Kogyo Kabushiki Kaisha. Display apparatus using dot matrixes. 4,590,464, Cl. 340-711.000.

Imaje S.A.: *See*—
Regnault, Luc; and Maingaud, Jean-Paul, 4,590,483, Cl. 346-1.100.

Imaki, Naoshi; and Fukumoto, Yoshiko, to Mitsubishi Chemical Industries, Ltd. Method for the partial hydrogenation of conjugated dienes. 4,590,319, Cl. 585-274.000.

Imamura, Takeshi: *See*—
Yamada, Yasuhiro; Imamura, Takeshi; Honda, Hidemasa; Sawaki, Toru; and Sasaki, Hideharu, 4,590,055, Cl. 423-447.400.

Imanishi, Kazuo, to Mitsubishi Denki Kabushiki Kaisha. System for modifying a synchronized control program for plural tool bases by adding standby data. 4,590,572, Cl. 364-474.000.

Imbert, Claude, to Becton, Dickinson and Company. Syringe barrel. 4,589,871, Cl. 604-240.000.

Imperial Chemical Industries Inc.: *See*—
Brown, James P.; Carroll, William G.; May, Ronald N.; Merckx, Erik M. B.; and Sparrow, David J., 4,590,226, Cl. 521-174.000.

Imperial Chemical Industries PLC: *See*—
Cartwright, David, 4,589,914, Cl. 71-103.000.
Chantler, Eric N.; Hutchinson, Francis G.; and Sharman, Deborah A., 4,590,070, Cl. 424-78.000.
Costello, Alan T.; and Milner, David J., 4,590,308, Cl. 568-812.000.
Grinter, Nigel J., 4,590,162, Cl. 435-172.300.
Lindley, Andrew A., 4,590,147, Cl. 430-286.000.

Inaba, Kazuo: *See*—
Koike, Yasuhisa; Kaneko, Kazuhiro; Inaba, Kazuo; and Yamamoto, Naoki, 4,590,340, Cl. 200-61.540.

Inaba, Naomi: *See*—
Imai, Masafumi; Yamamoto, Tadashi; Furuhashi, Hiroyuki; Ueno, Hiroshi; and Inaba, Naomi, 4,590,325, Cl. 585-512.000.

Inagaki, Atsushi: *See*—
Kobayashi, Kyoji; and Inagaki, Atsushi, 4,589,299, Cl. 74-458.000.

Inbar, Dan: *See*—
Fenster, Paul; and Inbar, Dan, 4,590,518, Cl. 358-111.000.

Index Werke Komm.-Ges Hahn & Tessky: *See*—
Link, Helmut F.; and Grossmann, Walter, 4,589,311, Cl. 82-2.500.

Indicon, Inc.: *See*—
Citrin, Paul S.; and Murcko, Nelson F., 4,589,870, Cl. 604-210.000.

Indikon Corporation: *See*—
Ginns, Haskell, 4,589,278, Cl. 73-117.300.

Inertia Dynamics Corp.: *See*—
Everts, Robert G., 4,589,386, Cl. 123-187.50R.

Ing. C. Olivetti & C., S.p.A.: *See*—
Valle, Franco; and Sofi, Sergio, 4,589,784, Cl. 400-56.000.

Ingersoll-Rand: *See*—
Arya, Satya P., 4,589,501, Cl. 173-131.000.

Iniotakis, Nicolas; von der Decken, Claus-Benedict; and Frohling, Werner, to Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung. Hydrogen permeatin membrane, process for its manufacture and use. 4,589,891, Cl. 55-158.000.

Inoue Attachment Co., Ltd.: *See*—
Inoue, Miyako, 4,589,848, Cl. 433-140.000.

Inoue, Hiromichi; Saito, Shinichi; Terashima, Kanetsugu; Inukai, Takashi; and Furukawa, Kenji, to Chisso Corporation. Liquid crystalline carbonic acid esters and liquid crystal compositions containing the same. 4,589,996, Cl. 252-299.650.

Inoue-Japax Research Incorporated: *See—*
Inoue, Kiyoshi, 4,590,352, Cl. 219-69.00M.

Inoue, Kiyoshi, to Inoue-Japax Research Incorporated. Dry-cut EDM with debris sweeping means. 4,590,352, Cl. 219-69.00M.

Inoue, Miyako, to Inoue Attachment Co., Ltd. Tongue press. 4,589,848, Cl. 433-140.000.

Inoue, Satoru: *See—*
Aoki, Mitsuo; Inoue, Satoru; Yamaguchi, Kimitoshi; Uchida, Mitsuru; Tomita, Masami; and Uematsu, Chiaki, 4,590,141, Cl. 430-108.000.

Inoue, Seizaburo; and Smith, Norvel L., to Bridgestone Corporation; and Bridgestone (U.S.A.), Inc. Device for grooving rubber material. 4,589,834, Cl. 425-369.000.

Inoue, Takao; and Yoshimura, Munehiro, to Matsushita Electric Industrial Co., Ltd. Optical disc. 4,590,493, Cl. 346-135.100.

Inoue, Takeshi; Saito, Hiroyuki; Takewaka, Tomoyuki; and Funabashi, Hiroshi, to Honda Giken Kogyo Kabushiki Kaisha. Muffler for internal combustion engines. 4,589,516, Cl. 181-256.000.

Institutal de Cercetare Stintifica si Inginerie Technologica Pentrj Industria Electrotehnica: *See—*
Apetrei, Constantin; Slaifer, Sigismund; Vatafu-Gaitan, Laurentiu; Stefanescu, Dumitru; Marinescu, Stelian; and Catana, Marin, 4,589,534, Cl. 192-18.00B.

Interlego A.G.: *See—*
Bach, Erik; and Dideriksen, Erling T., 4,589,702, Cl. 301-63.0PW.

International Biotechnologies, Inc.: *See—*
Kreisher, John H., 4,589,965, Cl. 204-182.800.

International Business Machines: *See—*
Cummings, Kenneth D.; Gould, Donald R.; Gray, Forrest C.; and Pereira, Lawrence W., 4,590,585, Cl. 364-900.000.

International Business Machines Corporation: *See—*
Behringer, Uwe; Greschner, Johann; and Trumpp, Hans-Joachim, 4,589,952, Cl. 156-628.000.
Christiansen, Robert A.; Rose, Frank M., Jr.; Smith, James R.; and Woosley, Kenneth D., 4,589,584, Cl. 228-110.000.
Corbin, John S., Jr.; Polk, Darryl R.; and Ramirez, Ciro N., 4,589,790, Cl. 400-322.000.
Edmonds, Harold D.; and Kulkarni, Murlidhar V., 4,590,574, Cl. 364-498.000.
Eilert, John H.; Levin, Arthur L.; and Thomas Julian, 4,590,550, Cl. 364-200.000.
Goth, George R.; Hansen, Thomas A.; and Villetto, Robert T., Jr., 4,589,193, Cl. 29-576.00W.
Hunt, Ronald E.; and Whitehead, Verlon E., 4,589,621, Cl. 248-586.000.
Linde, Harold G.; MacIntyre, Michael W.; and Motsiff, William T., 4,590,258, Cl. 528-189.000.
Ringer, Frederick C., Jr., 4,590,094, Cl. 427-82.000.
Rohrer, Gene D., 4,590,606, Cl. 382-7.000.

International Flavors & Fragrances Inc.: *See—*
Pittet, Alan O.; Muralidhara, Ranya; Vock, Manfred H.; Miller, Kevin P.; Luccarelli, Domenick, Jr.; and Wiener, Charles, 4,590,082, Cl. 426-535.000.

International Microelectronic Products Corporation: *See—*
Gerzberg, Levy, 4,590,589, Cl. 365-100.000.

International Paper Company: *See—*
Stevens, Grady E., 4,589,614, Cl. 244-136.000.

International Standard Electric Corporation: *See—*
Brewster, Arthur E., 4,590,374, Cl. 250-338.000.
Needham, Barbara; and Ross, Peter W., 4,589,734, Cl. 350-336.000.

International Technology Services, Inc.: *See—*
Schoenhard, James D., 4,590,261, Cl. 528-488.000.

InTest Corporation: *See—*
Smith, Nathan R., 4,589,815, Cl. 414-590.000.

Intravascular Surgical Instruments, Inc.: *See—*
Kensey, Kenneth R., 4,589,412, Cl. 128-305.000.

Inui, Osamu: *See—*
Fukui, Izumu; Hamatsuki, Takeshige; Yano, Takeshi; Sato, Eiichi; and Inui, Osamu, 4,589,786, Cl. 400-124.000.

Inui, Toshiharu: *See—*
Noguchi, Akio; Moriguchi, Haruhiko; Inui, Toshiharu; and Hisatake, Masayuki, 4,590,487, Cl. 346-76.0PH.

Inukai, Takashi: *See—*
Inoue, Hiromichi; Saito, Shinichi; Terashima, Kanetsugu; Inukai, Takashi; and Furukawa, Kenji, 4,589,996, Cl. 252-299.650.

Irie, Toshio: *See—*
Yasuda, Akira; Irie, Toshio; and Konishi, Motoyuki, 4,589,931, Cl. 148-12.00C.

Irmscher, Klaus; Jonas, Rochus; Uhl, Jurgen; and Schorscher, Ernst, to Merck Patent Gesellschaft mit beschrankter Haftung. Use of adenosine derivatives as psychopharmacological agents. 4,590,180, Cl. 514-46.000.

IRT Corporation: *See—*
Lukens, H. Richard, 4,590,377, Cl. 250-361.00R.

Irwin, Everett F., to Dynacycle Corporation. Rotary piston engine with reciprocating cylinders having sealing and friction reducing members. 4,589,328, Cl. 91-498.000.

Isaacs, Bruce H., to Atlantic Richfield Company. Preparation of soluble molybdenum catalysts for epoxidation of olefins. 4,590,172, Cl. 502-160.000.

Ishida, Kohji: *See—*
Ohtaki, Kiyoshi; and Ishida, Kohji, 4,590,615, Cl. 455-304.000.

Ishida, Toshio: *See—*
Akamatsu, Yoshihiro; Azuma, Tadashi; and Ishida, Toshio, 4,590,534, Cl. 361-212.000.

Ishigaki, Isao; Makimoto, Mitsuo; and Yamashita, Sadahiko, to Matsushita Electric Industrial Co., Ltd. Transistor oscillator with compensating circuit for variable collector-base capacitance. 4,590,443, Cl. 331-117.00R.

Ishihara Sangyo Kaisha Ltd.: *See—*
Haga, Takahiro; Toki, Tadaaki; Koyanagi, Toru; Okada, Hiroshi; Yoshida, Kiyomitsu; and Imai, Osamu, 4,590,182, Cl. 514-80.000.

Ishii, Wataru: *See—*
Nakane, Hisashi; Yokota, Akira; Yabuta, Mitsuo; Tsuda, Minoru; and Ishii, Wataru, 4,590,149, Cl. 430-325.000.

Ishikawa, Seiji; and Hirose, Masanori, to Toyota Jidosha Kabushiki Kaisha. Device for controlling temperature of switch knob. 4,589,593, Cl. 236-94.000.

Ishikawa, Yoshikazu; and Kiuchi, Takeo, to Honda Giken Kogyo K.K. Method of controlling the fuel supply to an internal combustion engine at acceleration. 4,590,564, Cl. 364-431.070.

Ishikawajima-Harima Jukogyo Kabushiki Kaisha: *See—*
Hotta, Minoru; Hara, Okitada; and Araki, Toshimitsu, 4,589,799, Cl. 405-196.000.

Ishima, Kazumi, to Ricoh Company, Ltd. Drive circuit for temperature control heater in ink jet printer. 4,590,362, Cl. 219-497.000.

Isobe, Kenichi: *See—*
Kanada, Eiji; Kondo, Toshiro; and Isobe, Kenichi, 4,589,920, Cl. 106-30.000.

Isolite Babcock Refractories Co., Ltd.: *See—*
Dohnomoto, Tadashi; Kubo, Masahiro; and Kito, Haruo, 4,590,132, Cl. 428-614.000.

Isono, Hiroyuki, to Tachikawa Spring Co., Ltd. Vehicle seat. 4,589,695, Cl. 297-284.000.

Israel, Michael B. Exponential mixing and delivery system. 4,589,867, Cl. 604-85.000.

Itaba, Yasushi; Saito, Keichiro; Tabuchi, Jyoichi; and Yoshizawa, Masao, to Toa Nenryo Kogyo Kabushiki Kaisha. Method of producing oriented polyethylene film. 4,590,020, Cl. 264-22.000.

Itakura, Yoshio: *See—*
Yatabe, Toshiaki; Suzuki, Nobuo; and Itakura, Yoshio, 4,590,118, Cl. 428-215.000.

Itek Graphix Corp.: *See—*
Dodge, Dennis W., 4,589,861, Cl. 474-178.000.

Ito, Eiji: *See—*
Yagi, Michio; and Ito, Eiji, 4,589,604, Cl. 242-71.600.

Ito, Hideyuki; and Takanashi, Nobuyasu, to Terumo Corp. Package. 4,589,568, Cl. 220-359.000.

Ito, Hiroshi; and Yamada, Shigemichi, to Toyota Jidosha Kabushiki Kaisha. Speed selection means for vehicle transmission system providing either manual or fully automatic operation. 4,589,532, Cl. 192-0.030.

Ito, Satoru, to Diesel Kiki Co., Ltd. Injection timing control device in a distributor-type fuel injection pump. 4,589,394, Cl. 123-502.000.

Itoh, Isao: *See—*
Kamada, Keiichi; Iiyama, Katuaki; Yano, Yasushi; and Itoh, Isao, 4,590,230, Cl. 524-77.000.

Itoh, Kiyoo; and Hori, Ryoichi, to Hitachi, Ltd. Monolithic semiconductor memory. 4,590,588, Cl. 365-51.000.

Itoh, Masanori; Takenaka, Fumio; and Tohya, Kouzi, to Daicel Chemical Industries, Ltd. Photopolymerization initiator comprised of thioxanthones and oxime esters. 4,590,145, Cl. 430-281.000.

Itoi, Takashi: *See—*
Fukumoto, Yasuhisha; Moriyama, Noboru; and Itoi, Takashi, 4,589,995, Cl. 252-180.000.

ITT Corporation: *See—*
Sedig, Albert R.; and Boccelli, Fred A., 4,589,721, Cl. 339-210.00R.

Ivanova, Tatyana L.: *See—*
Malyshev, Boris N.; Saljuk, Viktor A.; Skobelkin, Oleg X.; Brekhov, Evgeny I.; Smirnov, Boris A.; Korolkov, Ivan A.; Bashilov, Viktor P.; and Ivanova, Tatyana L., 4,589,413, Cl. 128-305.000.

Iwaki, Yoshiyuki; and Katashima, Tadashi, to Mitsubishi Denki Kabushiki Kaisha. Control apparatus for charging generator. 4,590,415, Cl. 320-64.000.

Iwama, Akio: *See—*
Kazuse, Yoshitaka; Iwama, Akio; and Chikura, Shinichi, 4,590,098, Cl. 427-244.000.

Iwane, Yoshitaka: *See—*
Sugiyama, Hiroshi; Hosoda, Keizo; Okada, Masanori; Iwane, Yoshitaka; and Murakami, Yasushi, 4,590,198, Cl. 514-336.000.

Iwasa, Seiichi; Nogiwa, Kengo; and Kaneko, Yoshiya, to Fujitsu Limited. Magnetic bubble memory device. 4,590,587, Cl. 365-1.000.

Iwasaki, Juzaemon; and Ihara, Shinji, to Matsushita Electric Works, Ltd. Portable electric circular saw. 4,589,208, Cl. 30-376.000.

Iwasaki, Masamitsu; Suzuki, Takeshi; Koizumi, Takashi; Takahashi, Takehiko; Shibata, Kazumasa; Komori, Nobutoshi; and Shimizu, Atsuyoshi, to Chisso Corporation. Apparatus for after-treating polyolefin powder. 4,589,215, Cl. 34-182.000.

Iwata, Masayosi; Hayashi, Yoshikazu; and Yokoyama, Tadashi, to Kabushiki Kaisha Tokai-rika-denki-seisakusho. Column mounted switching device. 4,590,341, Cl. 200-61.540.

Iwata, Toshiharu: *See—*
Takasu, Yasuhito; Iwata, Toshiharu; Haraguchi, Hiroshi; and Hosoe, Katsuharu, 4,590,565, Cl. 364-431.080.

Iwata, Yasuhiro; Watanabe, Toshiyuki; and Kobayashi, Seiichi, to Kabushiki Kaisha Toshiba. Original transfer apparatus. 4,589,768, Cl. 355-50.000.

Izumi, Takayuki, to Toa Nenryo Kogyo Kabushiki Kaisha. Optically anisotropic carbonaceous pitch and process for producing the same. 4,589,974, Cl. 208-22.000.

Izumiya, Shunzo: *See*—
Obara, Haruki; Izumiya, Shunzo; Okuyama, Yuji; and Sakurai, Akihiro, 4,590,353, Cl. 219-69.00C.

J. M. Huber Corporation: *See*—
Rives, Joe F.; and Carson, Forrest L., 4,589,566, Cl. 220-316.000.

J. R. Simplot Company: *See*—
Pinegar, Richard K., 4,590,080, Cl. 426-441.000.

Jackson, Melvin R.; Gigliotti, Michael F. X., Jr.; and Yang, Swe-Wong, to General Electric Company. Carbide reinforced nickel-base superalloy eutectics having improved resistance to surface carbide formation. 4,589,937, Cl. 148-404.000.

Jacobs, Harold, deceased (by Jacobs, Lydia S., executrix); and Horn, Robert E., to United States of America, Army. Filter reflection image guide oscillator and solid state line scanning device. 4,590,441, Cl. 331-107.0DP.

Jacobs, Lydia S., executrix: *See*—
Jacobs, Harold, deceased; and Horn, Robert E., 4,590,441, Cl. 331-107.0DP.

Jaki, Ivan, to Telefonaktiebolaget LM Ericsson. Supply circuit included in a DC-magnetized hybrid transformer. 4,590,334, Cl. 179-170.00D.

Jamain, Patrice C.: *See*—
Caye, Paul D.; Jamain, Patrice C.; and Weisser, Bernard G., 4,589,707, Cl. 308-10.000.

James, James R.; and Johnson, Reginald H., to National Research Development Corporation. Electromagnetic medical applicators. 4,589,422, Cl. 128-804.000.

James River-Dixie/Northern, Inc.: *See*—
Brown, Richard K.; and Maroszek, Raymond V., 4,590,349, Cl. 219-10.55E.

James River Graphics, Inc.: *See*—
Bennett, Everett W.; and Suchy, Jan B., 4,590,006, Cl. 260-393.000.
Desjarlais, Robert C.; and Bennett, Everett W., 4,590,263, Cl. 534-558.000.

Jang, Choong-Gook, to Tech Trade Corp. Dry direct compression compositions for controlled release dosage forms. 4,590,062, Cl. 424-19.000.

Janssen, Robert A.: *See*—
Mayhan, Kenneth G.; Janssen, Robert A.; and Bertrand, William J., 4,589,964, Cl. 522-85.000.

Japan Styrene Paper Corp.: *See*—
Naohara, Junsuke; Horie, Toshiki; and Kino, Toru, 4,589,845, Cl. 432-239.000.

Jeal, Harvey P., to Avdel Limited. Method for making a nut for a blind fastener. 4,589,155, Cl. 10-86.00A.

Jehle, Fritz: *See*—
Willenbacher, Erich; and Jehle, Fritz, 4,589,363, Cl. 112-308.000.

Jennings, Mansel A.: *See*—
Young, William O., Jr.; Hankinson, Julian E., Jr.; and Jennings, Mansel A., 4,589,580, Cl. 226-119.000.

Jensen, Peter W.; and Palthe, Richard W., to Ampex Corporation. System for processing a composite color television signal obtained from a recording medium. 4,590,510, Cl. 358-19.000.

Jerry, James H.; and VanderEyk, Garry J., to Champion Road Machinery Limited. Eight speed drop box transmission. 4,589,295, Cl. 74-360.000.

Jidosha Denki Kogyo Kabushiki Kaisha: *See*—
Kobayashi, Kyoji; and Inagaki, Atsushi, 4,589,299, Cl. 74-458.000.

Joanna Western Mills Company: *See*—
Meyers, Frederick C.; and Mann, David B., 4,589,312, Cl. 82-47.000.
Meyers, Frederick C.; and Mann, David B., 4,589,313, Cl. 82-63.000.

Johansson, Erik I.: *See*—
Wiklund, Klas R.; and Johansson, Erik I., 4,590,466, Cl. 340-870.280.

Johnson, Dwight N., to Fillpro Products, Inc. Plumbing hookup kit. 4,589,688, Cl. 285-12.000.

Johnson Fishing, Inc.: *See*—
Hastings, John D., 4,589,223, Cl. 43-42.240.

Johnson, Horace A.; and Smith, Roger, Jr., to Hughes Tool Company. Top drive drilling apparatus with improved wrench assembly. 4,589,503, Cl. 175-113.000.

Johnson, Keith, Jr.: *See*—
Burgit, Richard A.; Davis, Newton G.; Goyert, Josita M.; Johnson, Keith, Jr.; Long, Robert A.; and Stachura, Joseph F., 4,589,200, Cl. 29-753.000.

Johnson, Michael D., to Becton, Dickinson and Company. Method of making foamed slip resistant surfaces. 4,589,940, Cl. 156-78.000.

Johnson, Reginald H.: *See*—
James, James R.; and Johnson, Reginald H., 4,589,422, Cl. 128-804.000.

Joly, Claude, to Bronzavia. Piece with integrated heat-insulating covering. 4,590,116, Cl. 428-182.000.

Jonas, Rochus: *See*—
Irmscher, Klaus; Jonas, Rochus; Uhl, Jurgen; and Schorscher, Ernst, 4,590,180, Cl. 514-46.000.

Jones, Georgeanna S.: *See*—
Hodgen, Gary D.; Jones, Howard W., Jr.; and Jones, Georgeanna S., 4,589,402, Cl. 128-1.00R.

Jones, Howard W., Jr.: *See*—
Hodgen, Gary D.; Jones, Howard W., Jr.; and Jones, Georgeanna S., 4,589,402, Cl. 128-1.00R.

Jones, Kenneth H. Window buck or pouring frame. 4,589,624, Cl. 249-177.000.

Jones, Marvin R., to Koomey Blowout Preventers, Inc. Hydraulically operated valves. 4,589,625, Cl. 251-1.300.

Jones, Philip; Jones, William R.; and Storey, Moorfield, Jr., to Boeing Company, The. Electro-optical ranging apparatus having scanning circuitry and servoloop processor for resolving separation of images on photoelectric detector arrays. 4,589,770, Cl. 356-1.000.

Jones, William R.: *See*—
Jones, Philip; Jones, William R.; and Storey, Moorfield, Jr., 4,589,770, Cl. 356-1.000.

Jones, William T., to Plant Specialties Company. Heat recovery system employing a temperature controlled variable speed fan. 4,589,475, Cl. 165-35.000.

Jonsson, Bert O. Object sensing apparatus. 4,590,410, Cl. 318-480.000.

Jourdain, Claude: *See*—
Rovati, Philippe; Jourdain, Claude; and de Witte, Olivier, 4,590,375, Cl. 250-348.000.

Jourde, Jean-Pierre; and Miettaux, Marc, to Regie Nationale des Usines Renault. Safety device for constant-pressure injection valve of internal combustion engine. 4,589,393, Cl. 123-460.000.

Joy Manufacturing Company: *See*—
Barari, Hari B.; and Mullins, Lance A., 4,589,981, Cl. 209-474.000.

Juan, Ming-Sheng: *See*—
Liu, Yih H.; and Hour, Jiin Y., 4,589,214, Cl. 33-531.000.

Juers, Arthur A.: *See*—
Titcomb, Stanley T.; and Juers, Arthur A., 4,590,076, Cl. 426-62.000.

Jujo Paper Co., Ltd.: *See*—
Fujimura, Fumio; Satake, Toshimi; Mori, Manabu; Minami, Toshiaki; and Fukuchi, Tadakazu, 4,590,499, Cl. 346-209.000.
Satake, Toshimi; Kimura, Yoshihide; and Fujimura, Fumio, 4,590,500, Cl. 346-209.000.

Julius Blum Gesellschaft m.b.H.: *See*—
Rock, Erich; and Brunner, Josef, 4,589,710, Cl. 312-330.00R.

Jun, Mong-Jon: *See*—
Schornick, Gunnar; Jun, Mong-Jon; Sanner, Axel; Lehner, August; Lenz, Werner; Richter, Peter; and Eckell, Albrecht, 4,590,144, Cl. 430-273.000.

Jung, Hans-Ulrich: *See*—
Schnelle, Eberhard; Jung, Hans-Ulrich; Mussler, Rudiger; and Pfeuffer, Reinhard, 4,589,642, Cl. 269-325.000.

Jurdi, Wissam J.: *See*—
Shibata, Tomoo; Jurdi, Wissam J.; and Nomura, Minoru, 4,590,497, Cl. 346-201.000.

Kabushiki Kaisha Daikin Seisakusho: *See*—
Mori, Mituyoshi, 4,589,293, Cl. 74-15.600.

Kabushiki Kaisha Ishida Koki Seisakusho: *See*—
Takahashi, Naoki, 4,589,505, Cl. 177-2.000.

Kabushiki Kaisha Kanesaka Gijutsu Kenkyusho: *See*—
Kanesaka, Hiroshi, 4,589,859, Cl. 474-148.000.

Kabushiki Kaisha Kobe Seiko Sho: *See*—
Kurumaji, Masanobu; Sano, Tsutomu; Kondo, Hiroaki; Mizutani, Masao; and Yodono, Kazuei, 4,589,839, Cl. 425-547.000.

Kabushiki Kaisha Komatsu Seisakusho: *See*—
Shirao, Shojiro, 4,589,819, Cl. 414-752.000.

Kabushiki Kaisha Medos Kenkyusho: *See*—
Ouchi, Teruo; Tamada, Kazukiyo; and Yamaka, Shiyouichi, 4,589,403, Cl. 128-4.000.

Kabushiki Kaisha Okuma Tekkosho: *See*—
Takezawa, Isao; and Wakaoka, Shunsuke, 4,590,580, Cl. 364-571.000.

Kabushiki Kaisha Takara: *See*—
Tsuda, Masaaki, 4,589,947, Cl. 156-521.000.

Kabushiki Kaisha Tokai-rika-denki-seisakusho: *See*—
Iwata, Masayosi; Hayashi, Yoshikazu; and Yokoyama, Tadashi, 4,590,341, Cl. 200-61.540.
Suzuki, Masaru, 4,590,338, Cl. 200-5.00R.

Kabushiki Kaisha Toshiba: *See*—
Iwata, Yasuhiro; Watanabe, Toshiyuki; and Kobayashi, Seiichi, 4,589,768, Cl. 355-50.000.
Kusakabe, Hiromi, 4,590,433, Cl. 329-50.000.
Tabata, Mitsuo, 4,590,382, Cl. 250-491.100.
Tanaka, Tatsuo, 4,590,435, Cl. 330-258.000.
Yana, Masasumi, 4,590,486, Cl. 346-76.0PH.

Kabushiki Kaisha Toyota Chuo Kenkyusho: *See*—
Sugiyama, Jun; Nonomura, Yutaka; Tsukada, Kouji; Shimaoka, Keiichi; Takeuchi, Masaharu; and Takeuchi, Takashi, 4,589,290, Cl. 73-862.360.

Kabushiki Kaisha Yaskawa Denki Seisakusho: *See*—
Nagamatsu, Toshio, 4,590,398, Cl. 310-239.000.

Kadia-Diamant Maschinen- und Werkzeugfabrik O. Kopp GmbH & Co.: *See*—
Duffner, August, 4,589,805, Cl. 408-21.000.

Kagabu, Shinzo: *See*—
Shiokawa, Kozo; Kagabu, Shinzo; and Tsuboi, Shinichi, 4,590,272, Cl. 544-335.000.

Kagei, Kazunori: *See*—
Moriya, Yasuo; and Kagei, Kazunori, 4,590,248, Cl. 526-228.000.

Kahler & Breum: *See*—
Breum, Jens, 4,589,643, Cl. 220-5.00R.

Kaiser, Joachim: *See*—
Konz, Elmar; Hock, Franz; Kaiser, Joachim; and Kruse, Hansjorg, 4,590,273, Cl. 544-363.000.

Kakimi, Fujio: *See*—
Akiyoshi, Yutaka; Kobayashi, Shinzo; Kakimi, Fujio; and Matsukawa, Hiroharu, 4,590,170, Cl. 436-533.000.
Kaku, Shinkyo: *See*—
Rallapalli, Krishna; and Kaku, Shinkyo, 4,590,521, Cl. 358-261.000.
Kalt, Paul: *See*—
Muller, Kurt; Kalt, Paul; Steiner, Pirmin; and Hurlemann, Ernst, 4,589,325, Cl. 89-33.020.
Kaltenbach & Voight GmbH & Co.: *See*—
Loge, Hans; Eibofner, Eugen; and Mossle, Walter, 4,589,847, Cl. 433-126.000.
Kalz, Hans-Jurgen: *See*—
Rieck, Hans-Peter; Kalz, Hans-Jurgen; May, Adolf; Quack, Jochen M.; and Bucking, Hans-Walter, 4,589,988, Cl. 252-8.800.
Kamada, Keiichi; Iiyama, Katuaki; Yano, Yasushi; and Itoh, Isao, to Mitsui Toatsu Chemicals, Incorporated. Adhesive composition for ceramic tiles. 4,590,230, Cl. 524-77.000.
Kamishita, Mamoru: *See*—
Yudate, Kozo; Ohsugi, Yukihiro; Kamishita, Mamoru; and Nagasawa, Ken, 4,589,975, Cl. 208-44.000.
Kampf, Richard S., to Beckman Instruments, Inc. Sample container transfer mechanism. 4,589,540, Cl. 198-345.000.
Kamps, Manfred: *See*—
Albert, Gert; Kamps, Manfred; Noweck, Klaus; Reichenauer, Ansgar; Scherf, Erich; and Ziegler, Udo, 4,590,289, Cl. 556-188.000.
Kanada, Eiji; Kondo, Toshiro; and Isobe, Kenichi, to Mitsubishi Paper Mills, Ltd.; and Shin-Etsu Chemical Ltd. Ink composition utilized in lithographic printing and a lithographic printing process. 4,589,920, Cl. 106-30.000.
Kanai, Masatatsu: *See*—
Kanai, Shigeru; and Kanai, Masatatsu, 4,589,696, Cl. 297-284.000.
Kanai, Shigeru; and Kanai, Masatatsu, to Tachikawa Spring Co., Ltd. Adjustment/engagement device in a vehicle seat. 4,589,696, Cl. 297-284.000.
Kane, John L.; and Machlan, G. Richard, to Owens-Corning Fiberglas Corporation. Method of depositing a membrane within a conduit. 4,589,447, Cl. 138-98.000.
Kanegafuchi Kagaku Kogyo Kabushiki Kaisha: *See*—
Tsubokura, Yoshihisa; Yamamoto, Sumio; Aoishi, Eiji; and Fujita, Tamio, 4,590,232, Cl. 524-178.000.
Kaneko, Kazuhiro: *See*—
Koike, Yasuhisa; Kaneko, Kazuhiro; Inaba, Kazuo; and Yamamoto, Naoki, 4,590,340, Cl. 200-61.540.
Kaneko, Takushi: *See*—
Vyas, Dolatrai M.; Kaneko, Takushi; and Doyle, Terrence W., 4,590,074, Cl. 544-58.200.
Kaneko, Yoshiya: *See*—
Iwasa, Seiichi; Nogiwa, Kengo; and Kaneko, Yoshiya, 4,590,587, Cl. 365-1.000.
Kanesaka, Hiroshi, to Usui Kokusai Sangyo Kabushiki Kaisha; and Kabushiki Kaisha Kanesaka Gijutsu Kenkyusho. Continuously variable transmission. 4,589,859, Cl. 474-148.000.
Kanis, Walter, to Zschokke Wartmann AG. Process for producing a tank, particularly for transformers. 4,589,587, Cl. 228-183.000.
Kanoto, Masanobu, to Canon Kabushiki Kaisha. Sheet aligning device. 4,589,654, Cl. 271-314.000.
Kanski, Richard O., to Frederick & Herrud, Inc. Meat roll cutting machine. 4,589,318, Cl. 83-409.100.
Kanuma, Akira: *See*—
Yaguchi, Toshiyuki; Kanuma, Akira; and Tamaru, Kiichiro, 4,590,584, Cl. 364-748.000.
Kao Corporation: *See*—
Fukumoto, Yasuhisha; Moriyama, Noboru; and Itoi, Takashi, 4,589,995, Cl. 252-180.000.
Kaplan, Paul M.: *See*—
Zolton, Raymond P.; Kaplan, Paul M.; and Padvelskis, John V., 4,590,002, Cl. 530-386.000.
Kardos, Mihaly: *See*—
Tamasi, Attila; Kardos, Mihaly; and Farago, Laszlo , 4,589,273, Cl. 73-11.000.
Karim, Frank; Frank, Howard L.; and Hopman, Nicholas C., to Motorola, Inc. Injector driver fault detect and protection device. 4,589,401, Cl. 123-479.000.
Karino, Kimiji: *See*—
Kosuge, Tokuo; and Karino, Kimiji, 4,589,389, Cl. 123-326.000.
Karius, Klaus D.: *See*—
Hellwig, Rolf; Seidensticker, Jens; and Karius, Klaus D., 4,589,340, Cl. 102-293.000.
Karls, Michael A., to Brunswick Corporation. Flushing device for outboard motors. 4,589,851, Cl. 440-88.000.
Karlsson, Hans: *See*—
Edwall, Bengt; and Karlsson, Hans, 4,590,046, Cl. 423-242.000.
Karrer, Friedrich, to Ciba-Geigy Corporation. Process for the preparation of 1-diorganocarbamoyl-polyalkylpiperidines. 4,590,268, Cl. 544-121.000.
Karsner, Grant G.: *See*—
Adams, Terry N.; Spurrell, Robert M.; Karsner, Grant G.; Golike, Gregory P.; and Lincoln, James F. L., 4,589,356, Cl. 110-347.000.
Karwowski, Jan, to Nabisco Brands. Method of preparing instant, flaked, wheat farina. 4,590,088, Cl. 426-621.000.
Kasama, Nobuhiro; and Kurata, Mitsuru, to Canon Kabushiki Kaisha. Image forming apparatus having a pair of openable housing sections. 4,589,758, Cl. 355-3.0FU.
Kaschig, Jurgen; Kleiner, Eduard K.; Mueller, Karl F.; and Cooke, Thomas W., to Ciba-Geigy Corporation. Fluoroaliphatic-thio,-sulfinyl, or sulfonyl substituted bicycloaliphatic amic acid amine salts, and compositions and use thereof. 4,590,129, Cl. 428-425.100.
Kasco Mfg. Co., Inc.: *See*—
Kaster, Paul G., 4,589,320, Cl. 83-794.000.
Kashiwagi, Kazuo: *See*—
Yanagi, Masaaki; Ono, Satoshi; Toda, Takao; Kashiwagi, Kazuo; Endo, Makoto; and Saito, Yoshihiro, 4,589,767, Cl. 355-45.000.
Kasper, William W.; Quon, Willard L.; and Van Domelen, Timothy D., to Du Pont de Nemours, E. I., and Company. Process for preparing poly(tetramethylene ether) glycol. 4,590,054, Cl. 423-467.000.
Kass, John J.: *See*—
Keenan, Thomas F.; and Kass, John J., 4,589,294, Cl. 74-331.000.
Kassegger, Friedrich: *See*—
Horak, Josef; and Kassegger, Friedrich, 4,589,474, Cl. 165-9.100.
Kaster, Paul G., to Kasco Mfg. Co., Inc. Log lifting and support apparatus. 4,589,320, Cl. 83-794.000.
Kasuda, Takashi: *See*—
Yamamoto, Khoichi; and Kasuda, Takashi, 4,589,364, Cl. 112-311.000.
Katabami, Tadashi: *See*—
Nishihashi, Hideji; Matsubayashi, Tadao; Katabami, Tadashi; and Matsuda, Ken-ichi, 4,590,160, Cl. 435-78.000.
Katano, Sigeyuki: *See*—
Mizoguchi, Hiroaki; Hayashibara, Toshio; Shitara, Tadashi; Katano, Sigeyuki; and Kume, Hideo, 4,589,827, Cl. 417-423.00R.
Katashima, Tadashi: *See*—
Iwaki, Yoshiyuki; and Katashima, Tadashi, 4,590,415, Cl. 320-64.000.
Kato, Hidetoshi: *See*—
Mayumi, Nobuo; Kato, Hidetoshi; and Matsuhashi, Hajime, 4,590,414, Cl. 320-64.000.
Kato, Hisatoyo; and Komaki, Takao, to Fuji Photo Film Co., Ltd. Subtraction processing method for radiation images. 4,590,517, Cl. 358-111.000.
Kato, Hisatoyo: *See*—
Taniguchi, Yutaka; and Kato, Hisatoyo, 4,589,731, Cl. 350-319.000.
Kato, Masahiko: *See*—
Yoshida, Yutaka; Hirayama, Shozo; Kusunoki, Hiroyuki; Shishido, Yoshio; Matsuo, Kazumasa; Mizumoto, Morihide; Kato, Masahiko; and Hagino, Tadao, 4,589,414, Cl. 128-305.000.
Kato, Shigeru: *See*—
Takanashi, Itsuo; Tanaka, Hideshi; Ohara, Terumi; Kato, Shigeru; Takahashi, Toshinori; Kiuchi, Tsutomu; and Kitamura, Hiroki, 4,590,490, Cl. 346-76.0PH.
Kato, Tadaaki: *See*—
Maeda, Yuji; Yamato, Hideyuki; Fujii, Takayoshi; Kobayashi, Yasuhiko; Saito, Kenichi; Kato, Tadaaki; and Yoshikumi, Chikao, 4,590,184, Cl. 514-167.000.
Kato, Yasuo: *See*—
Ido, Satoshi; Fujinami, Minpei; Kato, Yasuo; Sakitani, Yoshio; and Ozasa, Susumu, 4,589,773, Cl. 356-371.000.
Katz, Edward: *See*—
Sidoti, Daniel R.; Dokos, John H.; Katz, Edward; and Moscowitz, Charles M., 4,590,085, Cl. 426-582.000.
Kauth, Richard J., to Environmental Research Institute of Michigan. Image correspondence techniques using serial neighborhood processing. 4,590,607, Cl. 382-41.000.
Kawabata, Yoshiaki: *See*—
Hatsugai, Satoshi; Kawabata, Yoshiaki; Fujiwara, Akira; Kojima, Hisashi; Harada, Haruo; Kudo, Kesayoshi; and Ohara, Shinya, 4,590,083, Cl. 426-557.000.
Kawagishi, Toshio; and Furutachi, Nobuo, to Fuji Photo Film Co., Ltd. Silver halide color photographic materials. 4,590,153, Cl. 430-551.000.
Kawaguchi, Akiyoshi: *See*—
Tasaka, Takeo; Kawaguchi, Akiyoshi; and Tsujikawa, Yozaburo, 4,590,234, Cl. 524-413.000.
Kawahata, Russell T.: *See*—
Scannon, Patrick J.; Spitler, Lynn E.; Lee, Howard M.; Kawahata, Russell T.; and Mischak, Ronald P., 4,590,071, Cl. 424-85.000.
Kawai, Hisao, to Hoya Corporation. Thin film EL element. 4,590,128, Cl. 428-411.100.
Kawai, Tohru, to Canon Kabushiki Kaisha. Lens mounting having a reversible motor for controlling focusing and aperture setting of a camera. 4,589,753, Cl. 354-400.000.
Kawakami, Ken-ichi; Yoshii, Toshiya; Suzuki, Masaru; and Okasaka, Hotsuma, to Toray Industries, Inc. Polyester film and magnetic recording medium therefrom. 4,590,119, Cl. 428-216.000.
Kawakubo, Yukio; Sugawara, Hiroyuki; Kuwabara, Kouji; Shirakura, Toshiharu; Takemori, Satoshi; and Sasaki, Kouji, to Hitachi, Ltd. Gas laser device. 4,590,599, Cl. 372-87.000.
Kawamura, Seiichiro, to Fujitsu Limited. Method for annealing by a high energy beam to form a single-crystal film. 4,589,951, Cl. 156-617.00R.
Kawano, Susumu, to U.S. Amada Limited. Sheet or plate material machining equipment. 4,589,317, Cl. 83-400.000.
Kawasaki Jukogyo Kabushiki Kaisha: *See*—
Fujikawa, Tetsuzo; and Tamba, Shinichi, 4,589,379, Cl. 123-41.490.
Kawasaki Steel Corporation: *See*—
Sakurada, Kazuyuki; Fujiwara, Takanori; and Funyu, Yutaka, 4,589,268, Cl. 72-8.000.
Yasuda, Akira; Irie, Toshio; and Konishi, Motoyuki, 4,589,931, Cl. 148-12.00C.
Kaye, Saul, to Ben Venue Laboratories, Inc. Means for consecutive introduction of co-acting sterilants into a sterilizing chamber. 4,590,037, Cl. 422-116.000.

Kayser, H. Steven: *See—*
Kroeber, Kenneth E.; and Kayser, H. Steven, 4,589,245, Cl. 53-248.000.

Kazama, Kazuyosi: *See—*
Sato, Zenjiro; and Kazama, Kazuyosi, 4,589,903, Cl. 71-9.000.

Kazuse, Yoshitaka; Iwama, Akio; and Chikura, Shinichi, to Nitto Electric Industrial Co., Ltd. Process for producing composite membrane. 4,590,098, Cl. 427-244.000.

Kearns, Peter J. M., to Burroughs Corporation. Self receipting continuous stationery for point-of-sale terminal. 4,589,683, Cl. 282-11.50A.

Kedem, Tuval, to Equipment Company of America. Pallet truck with hydraulic lift. 4,589,669, Cl. 280-43.120.

Kee, Richard C. E.: *See—*
Phipps, Warren W.; Kee, Richard C. E.; and Mather, T. Paul, 4,589,525, Cl. 188-2.00F.

Keenan, Thomas F.; and Kass, John J. Vehicle transmission with a plurality of forward and reverse speeds. 4,589,294, Cl. 74-331.000.

Kehrer, Wolfgang, to Borsig GmbH. Process and heat exchanger for cooling gases. 4,589,473, Cl. 165-1.000.

Keil, Rudolf: *See—*
Mathyssek, Konrad; and Keil, Rudolf, 4,589,897, Cl. 65-2.000.

Keim, Karl-Heinz: *See—*
Korff, Joachim; and Keim, Karl-Heinz, 4,590,306, Cl. 568-804.000.

Kelley, Bruce T., to Exxon Production Research Co. Method and apparatus to prevent hydrate formation in full wellstream transfer pipelines. 4,589,434, Cl. 137-1.000.

Kelley, Reginald D.: *See—*
Brown, John B.; and Kelley, Reginald D., 4,589,818, Cl. 414-744.00A.

Kelley, Robert G., to Champion International Corporation. Valve bag filling conduit. 4,589,454, Cl. 141-68.000.

Kelly, Hugh-Peter G. Linear motors and control circuitry therefor. 4,590,411, Cl. 318-687.000.

Kelly Services, Inc.: *See—*
Casey, James E., 4,589,849, Cl. 434-258.000.

Kelly, Thomas P.; and Fisher, Edmund A., to Cameron Iron Works, Inc. Subsea wellhead production apparatus with a retrievable subsea choke. 4,589,493, Cl. 166-341.000.

Kempa, Bernd-Joachim, to Elektro-Thermit GmbH. Frog for switches. 4,589,617, Cl. 246-388.000.

Kempter, Michael, to Webasto-Werk W. Baier GmbH & Co. Water draining system for frames of motor vehicle sliding roofs and similar devices, and a method of making same. 4,589,694, Cl. 296-213.000.

Kendall Company, The: *See—*
Thomas, Samuel J.; Robich, James M.; and Hayes, Robert L., 4,589,275, Cl. 73-40.50R.

Kendall, William F.; Smith, Richard A.; and Wadsworth, William, to Raynor Manufacturing Company. Foam core panel with interlocking skins and thermal break. 4,589,240, Cl. 52-309.110.

Kendon Manufacturing Ltd.: *See—*
Pakosh, Peter, 4,589,152, Cl. 5-164.00R.

Kenna, Robert V., to Pfizer Hospital Products Group, Inc. Femoral hip prosthesis. 4,589,883, Cl. 623-22.000.

Kennedy, Thomas D. Reusable locking device. 4,589,693, Cl. 292-315.000.

Kenney, Andrew C., to Celltech Limited. Separating animal cells from a liquid culture. 4,589,987, Cl. 210-725.000.

Kensey, Kenneth R., to Intravascular Surgical Instruments, Inc. Method and apparatus for surgically removing remote deposits. 4,589,412, Cl. 128-305.000.

Keritsis, Gus D., to Philip Morris Incorporated. Tobacco treatment. 4,589,428, Cl. 131-297.000.

Kernforschungsanlage Julich Gesellschaft mit beschrankter Haftung: *See—*
Iniotakis, Nicolas; von der Decken, Claus-Benedict; and Frohling, Werner, 4,589,891, Cl. 55-158.000.

Kernforschungszentrum Karlsruhe GmbH: *See—*
Wilhelm, Jurgen; and Mahnau, Heinrich, 4,590,372, Cl. 250-304.000.

Kettler, Ebert H. Air jump start system. 4,589,385, Cl. 123-179.00F.

Keung, Jay: *See—*
Balloni, Riccardo; and Keung, Jay, 4,590,125, Cl. 428-349.000.

Keys, Robert O., to Sherex Chemical Company, Inc. Promoters for froth flotation of coal. 4,589,980, Cl. 209-166.000.

Keystone International, Inc.: *See—*
Aldrich, Joe L., 4,589,281, Cl. 73-290.00R.

Keziah, David K.: *See—*
Starnes, Dennis L.; Kimball, William G.; and Keziah, David K., 4,589,361, Cl. 112-262.300.

Kia Industrial Co., Ltd.: *See—*
Ha, Jung Y., 4,590,406, Cl. 315-80.000.

Kielczewska, Elizabeth: *See—*
Delhaye, Jean-Noel; and Kielczewska, Elizabeth, 4,589,292, Cl. 73-863.030.

Kikta, Donald D.; and Regnier, Kent E., to Grayhill, Inc. Machine insertable DIP switch. 4,590,344, Cl. 200-291.000.

Kikuchi, Noriyuki: *See—*
Sawada, Takehiko; Miyazawa, Masanori; and Kikuchi, Noriyuki, 4,590,081, Cl. 426-448.000.

Kimball, John J.; Kirk, Harry V.; Roule, Richard L.; Sennett, Richard C.; and Sorbo, Peter J., to American Bank Note Company; and Kirk-Rudy, Inc. Apparatus and procedure for applying adhesive labels. 4,589,943, Cl. 156-256.000.

Kimball, William G.: *See—*
Starnes, Dennis L.; Kimball, William G.; and Keziah, David K., 4,589,361, Cl. 112-262.300.

Kimberly-Clark Corporation: *See—*
Singer, Wayne J., 4,589,408, Cl. 128-132.00R.

Kimura, Akio; and Horihawa, Yoshio, to Tokyo Kogaku Kikai Kabushiki Kaisha. Telescope with adjustable reticule. 4,589,744, Cl. 350-566.000.

Kimura, Yoshihide: *See—*
Satake, Toshimi; Kimura, Yoshihide; and Fujimura, Fumio, 4,590,500, Cl. 346-209.000.

King, Donald R.: *See—*
Chastain, Charles E.; and King, Donald R., 4,589,355, Cl. 110-346.000.

King, Stella W., to Merck & Co., Inc. Process for the preparation of cyclopropyl pyridine compounds useful as calcium channel blockers. 4,590,276, Cl. 546-75.000.

King, William R., to Phillips Petroleum Company. Carbon black reactor. 4,590,040, Cl. 422-156.000.

Kinkade, Nancy E., to Union Carbide Corporation. Catalytic process for the production of alcohols from carbon monoxide, hydrogen and olefins. 4,590,314, Cl. 568-909.000.

Kino, Toru: *See—*
Naohara, Junsuke; Horie, Toshiki; and Kino, Toru, 4,589,845, Cl. 432-239.000.

Kinoshita, Kimiaki: *See—*
Yahagi, Masakichi; Igaki, Tetsuo; Yosinaka, Sinzi; Morita, Kousaku; Saito, Morikuni; and Kinoshita, Kimiaki, 4,590,498, Cl. 346-208.000.

Kirch, William: *See—*
Dombro, Robert A.; and Kirch, William, 4,590,246, Cl. 526-106.000.

Kirk, Harry V.: *See—*
Kimball, John J.; Kirk, Harry V.; Roule, Richard L.; Sennett, Richard C.; and Sorbo, Peter J., 4,589,943, Cl. 156-256.000.

Kirk-Rudy, Inc.: *See—*
Kimball, John J.; Kirk, Harry V.; Roule, Richard L.; Sennett, Richard C.; and Sorbo, Peter J., 4,589,943, Cl. 156-256.000.

Kissinger, Carlos A.; and Goode, Raun L., to Motorola, Inc. Parallel roller tool for unloading semiconductor device sockets. 4,589,201, Cl. 29-764.000.

Kita, Yasushi; Nakano, Hisaji; Moroi, Shiro; and Sakanoue, Akira, to Central Glass Company, Limited. Method of safely preparing graphite fluoride. 4,590,316, Cl. 570-150.000.

Kitagawa Industries Co., Ltd.: *See—*
Sugiura, Haruyuki; Hayashi, Yoshitoki; and Matsui, Kazuhiro, 4,589,794, Cl. 403-187.000.

Kitajima, Goro: *See—*
Kobayashi, Minoru; Saitou, Sinichi; and Kitajima, Goro, 4,589,607, Cl. 242-180.000.

Kitamura, Hiroki: *See—*
Takanashi, Itsuo; Tanaka, Hideshi; Ohara, Terumi; Kato, Shigeru; Takahashi, Toshinori; Kiuchi, Tsutomu; and Kitamura, Hiroki, 4,590,490, Cl. 346-76.0PH.

Kitazawa, Yoichi: *See—*
Ohkuni, Shinichiro; and Kitazawa, Yoichi, 4,589,461, Cl. 152-209.00R.

Kito, Haruo: *See—*
Dohnomoto, Tadashi; Kubo, Masahiro; and Kito, Haruo, 4,590,132, Cl. 428-614.000.

Kiuchi, Takeo: *See—*
Ishikawa, Yoshikazu; and Kiuchi, Takeo, 4,590,564, Cl. 364-431.070.

Kiuchi, Tsutomu: *See—*
Takanashi, Itsuo; Tanaka, Hideshi; Ohara, Terumi; Kato, Shigeru; Takahashi, Toshinori; Kiuchi, Tsutomu; and Kitamura, Hiroki, 4,590,490, Cl. 346-76.0PH.

Kleeberg, Wolfgang: *See—*
Ahne, Hellmut; Kleeberg, Wolfgang; Rubner, Roland; and Kruger, Hans, 4,590,103, Cl. 427-387.000.

Kleemann, Axel: *See—*
Drauz, Karlheinz; and Kleemann, Axel, 4,590,305, Cl. 568-771.000.

Kleemann, Robert: *See—*
Eberle, Manfred; and Kleemann, Robert, 4,589,816, Cl. 414-680.000.

Klein, William G. Transparent static reducing mat. 4,590,120, Cl. 428-247.000.

Kleiner, Eduard K.: *See—*
Kaschig, Jurgen; Kleiner, Eduard K.; Mueller, Karl F.; and Cooke, Thomas W., 4,590,129, Cl. 428-425.100.

Klemann, Lawrence P., to Exxon Research and Engineering Co. Bi- or polymetallic coordination complex. 4,590,288, Cl. 556-112.000.

Klemm, Gerhard. Screen printing method and apparatus. 4,589,336, Cl. 101-124.000.

Klockner, Karl-Heinz: *See—*
Hofmann, Manfred; and Klockner, Karl-Heinz, 4,589,638, Cl. 267-8.00R.

Klotzer, Sieghart, to Agfa-Gevaert Aktiengesellschaft. Emulsion having high silver chloride content, photographic recording material and process for the production of photographic recordings. 4,590,155, Cl. 430-567.000.

Knapczyk, Jerome W., to Monsanto Company. Surface coating process. 4,590,101, Cl. 427-350.000.

Knight, Arthur A.: *See—*
Hamill, Stephen D.; and Knight, Arthur A., 4,589,399, Cl. 126-30.000.

Knight, Gerard S.; Dreyer, Perry A.; and Gjelhaug, Robert B., to Waymouth Farms Inc. Dispenser for solid foods. 4,589,576, Cl. 222-357.000.

Knogo Corporation: *See*—
Cooper, Michael N., 4,590,461, Cl. 340-572.000.
Knorr-Bremse AG: *See*—
Huber, Johann, 4,589,705, Cl. 303-36.000.
Knors, Herbert: *See*—
Reiners, Franz-Josef; Knors, Herbert; Tholen, Leo; and Toputt, Heinz-Lorenz, 4,589,602, Cl. 242-35.50R.
Knox, Dick L.: *See*—
Greiner, Tom D.; Guzy, Raymond L.; and Knox, Dick L., 4,589,492, Cl. 166-338.000.
Knud Erik Westergaard: *See*—
Schmidt, Jorgen, 4,589,825, Cl. 417-290.000.
Knuttel, Bertold: *See*—
Muller, Wolfgang; and Knuttel, Bertold, 4,590,428, Cl. 324-320.000.
Kobayashi, Hisanori: *See*—
Matsumura, Toshimi; Omori, Norio; and Kobayashi, Hisanori, 4,590,563, Cl. 364-431.050.
Kobayashi, Kyoji; and Inagaki, Atsushi, to Jidosha Denki Kogyo Kabushiki Kaisha. Reduction motor shaft provided with screw type double. 4,589,299, Cl. 74-458.000.
Kobayashi, Masaaki: *See*—
Honjo, Masahiro; Tomita, Masao; and Kobayashi, Masaaki, 4,590,523, Cl. 360-10.300.
Kobayashi, Masaharu: *See*—
Okamoto, Hiroo; Kobayashi, Masaharu; Hoshino, Takashi; and Nishida, Masami, 4,590,524, Cl. 360-65.000.
Kobayashi, Minoru; Saitou, Sinichi; and Kitajima, Goro, to Olympus Optical Co., Ltd. Magnetic recording tape driving apparatus. 4,589,607, Cl. 242-180.000.
Kobayashi, Seiichi: *See*—
Iwata, Yasuhiro; Watanabe, Toshiyuki; and Kobayashi, Seiichi, 4,589,768, Cl. 355-50.000.
Kobayashi, Shinzo: *See*—
Akiyoshi, Yutaka; Kobayashi, Shinzo; Kakimi, Fujio; and Matsukawa, Hiroharu, 4,590,170, Cl. 436-533.000.
Kobayashi, Toshihiko: *See*—
Sugio, Akitoshi; Masu, Masanobu; Amagai, Akikazu; and Kobayashi, Toshihiko, 4,590,239, Cl. 525-92.000.
Kobayashi, Yasuhiko: *See*—
Maeda, Yuji; Yamato, Hideyuki; Fujii, Takayoshi; Kobayashi, Yasuhiko; Saito, Kenichi; Kato, Tadaaki; and Yoshikumi, Chikao, 4,590,184, Cl. 514-167.000.
Kobori, Takeo: *See*—
Hasegawa, Yoshio; Kobori, Takeo; and Fukuda, Kazushige, 4,590,253, Cl. 528-14.000.
Kobori, Yasunori: *See*—
Fukushima, Isao; Kobori, Yasunori; and Nishijima, Hideo, 4,590,438, Cl. 330-300.000.
Kochs Adler AG: *See*—
Scholl, Hans, 4,589,359, Cl. 112-121.120.
Kochte, Werner W.; and Nimon, Susan K., to Scott & Fetzer Company, The. Vacuum driven tool. 4,589,161, Cl. 15-372.000.
Koenig, Andrew R., to AT&T Bell Laboratories. User authentication system employing encryption functions. 4,590,470, Cl. 340-825.310.
Koenig, James P.: *See*—
Hall, John L.; Shamine, Dennis R.; and Koenig, James P., 4,589,535, Cl. 192-70.120.
Koffel, William K., to General Electric Company. Rotor blade tip. 4,589,823, Cl. 416-92.000.
Kohler, Peter: *See*—
Brunn, Horst; Niggemann, Johannes; Kohler, Peter; and Hund, Franz, 4,589,906, Cl. 71-80.000.
Kohzai, Tetsuo; Murai, Naoyuki; and Yamasaki, Masayoshi, to Morita Fire Pump Mfg. Co., Ltd. Revolving block for high place working vehicle. 4,589,518, Cl. 182-2.000.
Koike, Akihiko: *See*—
Wazaki, Yoshio; Koike, Akihiko; and Koike, Yuzuru, 4,589,390, Cl. 123-339.000.
Koike, Hideharu, to Tokyo Shibaura Denki Kabushiki Kaisha. Integrated MOSFET transfer gate. 4,590,396, Cl. 307-572.000.
Koike, Yasuhisa; Kaneko, Kazuhiro; Inaba, Kazuo; and Yamamoto, Naoki, to Nihon Plast Co., Ltd. Steering wheel assembly for vehicles. 4,590,340, Cl. 200-61.540.
Koike, Yuzuru: *See*—
Wazaki, Yoshio; Koike, Akihiko; and Koike, Yuzuru, 4,589,390, Cl. 123-339.000.
Koizumi, Takashi: *See*—
Iwasaki, Masamitsu; Suzuki, Takeshi; Koizumi, Takashi; Takahashi, Takehiko; Shibata, Kazumasa; Komori, Nobutoshi; and Shimizu, Atsuyoshi, 4,589,215, Cl. 34-182.000.
Kojima, Hisashi: *See*—
Hatsugai, Satoshi; Kawabata, Yoshiaki; Fujiwara, Akira; Kojima, Hisashi; Harada, Haruo; Kudo, Kesayoshi; and Ohara, Shinya, 4,590,083, Cl. 426-557.000.
Kokubo, Eiichi; Goi, Koichi; Arikawa, Junichi; Ebihara, Hideyuki; and Chiba, Hiroshi, to Laurel Bank Machine Co., Ltd. Device for carrying bank notes stacked in container box adapted for use in automatic money depositing and disbursing machine. 4,589,708, Cl. 312-71.000.
Koledin, Michael J.; and Garth, Geoffrey C., to National Medical Distributors. Spine immobilizer. 4,589,407, Cl. 128-87.00R.
Koletzko, Wolfram: *See*—
Wackerle, Peter; Schulz, Ralf-Thilo; Sperber, Franz; Koletzko, Wolfram; and Prochaska, Wolfgang, 4,589,679, Cl. 280-777.000.
Komaki, Takao: *See*—
Kato, Hisatoyo; and Komaki, Takao, 4,590,517, Cl. 358-111.000.
Komatsu, Shigeru, to Tokyo Shibaura Denki Kabushiki Kaisha. Method for fabricating a semiconductor device by co-diffusion of arsenic and phosphorus. 4,589,936, Cl. 148-188.000.
Komori, Nobutoshi: *See*—
Iwasaki, Masamitsu; Suzuki, Takeshi; Koizumi, Takashi; Takahashi, Takehiko; Shibata, Kazumasa; Komori, Nobutoshi; and Shimizu, Atsuyoshi, 4,589,215, Cl. 34-182.000.
Komori Printing Machinery Co., Ltd.: *See*—
Tomita, Minoru, 4,589,368, Cl. 118-258.000.
Komori, Yuji, to Tokyo Shibaura Denki Kabushiki Kaisha. Recording bias oscillating circuit. 4,590,525, Cl. 360-66.000.
Kompis, Ivan; Locher, Rita; and Maag, Hans, to Hoffmann-La Roche Inc. 2,4-diamino-[4-piperidinyl]pyrimidines useful as antibacterial agents, antimalarial agents, antitumors agents. 4,590,270, Cl. 544-320.000.
Kondo, Hiroaki: *See*—
Kurumaji, Masanobu; Sano, Tsutomu; Kondo, Hiroaki; Mizutani, Masao; and Yodono, Kazuei, 4,589,839, Cl. 425-547.000.
Kondo, Takashi, to Minolta Camera Kabushiki Kaisha. Circuit for detecting the ratio of intensities of the color components of light. 4,590,512, Cl. 358-29.000.
Kondo, Toshiro: *See*—
Kanada, Eiji; Kondo, Toshiro; and Isobe, Kenichi, 4,589,920, Cl. 106-30.000.
Kondou, Masahide: *See*—
Ohtaki, Keizaburo; Niikawa, Ryo; and Kondou, Masahide, 4,589,199, Cl. 29-714.000.
Konig, Joachim; Suling, Carlhans; and Lindner, Christian, to Bayer Aktiengesellschaft. Process for the production of hydrophobicizing and oleophobicizing agents. 4,590,236, Cl. 524-460.000.
Konishi, Motoyuki: *See*—
Yasuda, Akira; Irie, Toshio; and Konishi, Motoyuki, 4,589,931, Cl. 148-12.00C.
Konishiroku Photo Industry Co., Ltd.: *See*—
Yagi, Michio; and Ito, Eiji, 4,589,604, Cl. 242-71.600.
Konno, Yoshihiro: *See*—
Kume, Satoru; Yoshida, Michiyasu; Konno, Yoshihiro; Kume, Tateo; Takada, Hiroaki; Shinsei, Kiyoichi; Matsumoto, Akio; and Ogawa, Hitoshi, 4,589,254, Cl. 60-286.000.
Konrad, Joseph D. Method and means for centerless circle construction. 4,589,210, Cl. 33-27.030.
Konz, Elmar; Hock, Franz; Kaiser, Joachim; and Kruse, Hansjorg, to Hoechst Aktiengesellschaft. Isoquinoline compounds. 4,590,273, Cl. 544-363.000.
Koomey Blowout Preventers, Inc.: *See*—
Jones, Marvin R., 4,589,625, Cl. 251-1.300.
Korczak, Alexander; and Levis, William W., Jr., to BASF Corporation. Polyurethane products based on alkylene oxide adducts of aniline having reduced viscosity. 4,590,225, Cl. 521-167.000.
Korff, Joachim; and Keim, Karl-Heinz, to Union Rheinische Braunkohlen Kraftstoff Aktiengesellschaft. Process for the conversion of meta/para-cresol mixtures. 4,590,306, Cl. 568-804.000.
Korinek, Robin, to Transilwrap Company. Method for laminating a composite assembly. 4,589,942, Cl. 156-148.000.
Korolkov, Ivan A.: *See*—
Malyshev, Boris N.; Saljuk, Viktor A.; Skobelkin, Oleg X.; Brekhov, Evgeny I.; Smirnov, Boris A.; Korolkov, Ivan A.; Bashilov, Viktor P.; and Ivanova, Tatyana L., 4,589,413, Cl. 128-305.000.
Korth, Willi: *See*—
Kuckens, Alexander; and Korth, Willi, 4,589,326, Cl. 89-145.000.
Kosky, Philip G.; and Guggenheim, Elizabeth A., to General Electric Company. High molecular weight linear polyesters and method for their preparation. 4,590,259, Cl. 528-272.000.
Kostelnicek, Richard J.: *See*—
Evans, John T.; and Kostelnicek, Richard J., 4,590,458, Cl. 340-347.0AD.
Kosuge, Tokuo; and Karino, Kimiji, to Hitachi, Ltd. Fuel injection control apparatus for internal combustion engines. 4,589,389, Cl. 123-326.000.
Kovar, Jack J. Spring tooth harrow, and spring tooth and tooth clip for a harrow. 4,589,497, Cl. 172-707.000.
Koyanagi, Toru: *See*—
Haga, Takahiro; Toki, Tadaaki; Koyanagi, Toru; Okada, Hiroshi; Yoshida, Kiyomitsu; and Imai, Osamu, 4,590,182, Cl. 514-80.000.
Kozlin, Joseph R., to United Technologies Corporation. Rotor blade having a tip cap end closure. 4,589,824, Cl. 416-97.00R.
Kozponti Valto- es Hitelbank Rt. Innovecios Alap: *See*—
Hidvegi, Valeria, 4,589,853, Cl. 446-123.000.
Kraemer, Erich H., to Sperry Corporation. Hermetically sealed planar structure for high frequency device. 4,590,617, Cl. 455-328.000.
Kraftwerk Union Aktiengesellschaft: *See*—
Krockow, Wolfram, 4,589,260, Cl. 60-737.000.
Steinberg, Eckard, 4,589,929, Cl. 148-6.300.
Kranz, Walter, to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung. Thrust nozzle system. 4,589,594, Cl. 239-265.250.
Krebs, Jay R.: *See*—
Burke, Timothy M.; Noble, Scott W.; Freeburg, Thomas A.; and Krebs, Jay R., 4,590,473, Cl. 340-825.520.
Kreisher, John H., to International Biotechnologies, Inc. Method for electroblotting. 4,589,965, Cl. 204-182.800.
Krieger, Klaus E., to Zinser Textilmaschinen GmbH. Yarn-drafting apparatus. 4,589,168, Cl. 19-240.000.
Krile, David J.: *See*—
Pieroway, Chesley S.; Blount, Alonzo; Britton, George L.; and Krile, David J., 4,590,471, Cl. 340-825.690.

Krob, Erwin; and Bauer, Helmut, to TMC Corporation. Apparatus for facilitating a longitudinal adjustment of ski-binding parts. 4,589,674, Cl. 280-633.000.

Krockow, Wolfram, to Kraftwerk Union Aktiengesellschaft. Pre-mixing burner with integrated diffusion burner. 4,589,260, Cl. 60-737.000.

Kroeber, Kenneth E.; and Kayser, H. Steven, to Standard-Knapp, Inc. Finger assembly for case loader. 4,589,245, Cl. 53-248.000.

Kroll, Arthur T.: *See—*
Robisch, Herman; and Kroll, Arthur T., 4,589,597, Cl. 239-703.000.

Krones AG Hermann Kronseder Maschinenfabrik: *See—*
Weiss, Wilhelm, 4,589,453, Cl. 141-39.000.

Kruger, Hans: *See—*
Ahne, Hellmut; Kleeberg, Wolfgang; Rubner, Roland; and Kruger, Hans, 4,590,103, Cl. 427-387.000.

Krumpholz, Hartmut: *See—*
Rebhan, Dieter; and Krumpholz, Hartmut, 4,589,234, Cl. 51-417.000.

Krupp Corpoplast Maschinenbau GmbH: *See—*
Rosenkranz, Otto; Horwege, Claus; and Hone, Norbert, 4,590,028, Cl. 264-154.000.

Kruse, Hansjorg: *See—*
Konz, Elmar; Hock, Franz; Kaiser, Joachim; and Kruse, Hansjorg, 4,590,273, Cl. 544-363.000.

Kryolitselskabet Oresund A/S: *See—*
Aunsholt, Knud E. H., 4,589,887, Cl. 44-16.00R.

Krystyniak, Casimir W.: *See—*
Siemers, Paul A.; and Krystyniak, Casimir W., 4,590,090, Cl. 427-34.000.

Krzystolik, Pawel: *See—*
Barton, Piotr; Krzystolik, Pawel; Sliz, Jan; Dworok, Roman; Lebecki, Kazimierz; and Slotwinski, Ryszard, 4,590,373, Cl. 250-308.000.

Kubasov, Vladimir L.: *See—*
Yurkov, Leonid I.; Busse-Machukas, Vladimir B.; Lvovich, Florenty I.; Kubasov, Vladimir L.; Uzbekov, Alexandr A.; Mazanko, Anatoly F.; and Fedotova, Natalya S., 4,589,969, Cl. 204-290.00F.

Kubo, Masahiro: *See—*
Dohnomoto, Tadashi; Kubo, Masahiro; and Kito, Haruo, 4,590,132, Cl. 428-614.000.

Kubota, Toru, to Nissan Motor Co., Ltd. Control system for a power steering motor of a battery operated vehicle. 4,590,409, Cl. 318-139.000.

Kuckens, Alexander; and Korth, Willi, to Technica Entwicklungsgesellschaft mbH & Co. KG. Self-loading pistol in the form of a mechanically locked recoil loader. 4,589,326, Cl. 89-145.000.

Kudo, Kesayoshi: *See—*
Hatsugai, Satoshi; Kawabata, Yoshiaki; Fujiwara, Akira; Kojima, Hisashi; Harada, Haruo; Kudo, Kesayoshi; and Ohara, Shinya, 4,590,083, Cl. 426-557.000.

Kuebler, Allan J.: *See—*
Lund, Mark A., 4,589,678, Cl. 280-772.000.

Kuhnel, Werner; and Spielau, Paul, to Dynamit Nobel AG. Method for the preparation of light-resistant and weather-proof polyolefin foams. 4,590,221, Cl. 521-85.000.

Kukes, Simon G.; and Banks, Robert L., to Phillips Petroleum Company. Olefin metathesis catalyst. 4,590,174, Cl. 502-219.000.

Kula, Maria-Regina; Hummel, Werner; Schutte, Horst; and Leuchtenberger, Wolfgang, to Degussa Aktiengesellschaft; and Gesellschaft fur biotechnologisch Forschung. Microbiologically produced L-phenylalanine-dehydrogenase, process for its recovery and use. 4,590,161, Cl. 435-108.000.

Kulkarni, Murlidhar V.: *See—*
Edmonds, Harold D.; and Kulkarni, Murlidhar V., 4,590,574, Cl. 364-498.000.

Kumagai, Yozo, to Hitachi, Ltd. Casting metal mold and method of producing the same. 4,589,930, Cl. 148-11.50C.

Kume, Hideo: *See—*
Mizoguchi, Hiroaki; Hayashibara, Toshio; Shitara, Tadashi; Katano, Sigeyuki; and Kume, Hideo, 4,589,827, Cl. 417-423.00R.

Kume, Masao: *See—*
Yonemura, Shigehiro; Umino, Hiroshi; Kume, Masao; Abe, Mitsuo; and Miyatake, Satoshi, 4,589,230, Cl. 51-95.0GH.

Kume, Satoru; Yoshida, Michiyasu; Konno, Yoshihiro; Kume, Tateo; Takada, Hiroaki; Shinsei, Kiyoichi; Matsumoto, Akio; and Ogawa, Hitoshi, to Mitsubishi Jidosha Kogyo Kabushiki Kaisha; and Mitsubishi Denki Kabushiki Kaisha. Regenerator for diesel particulate filter. 4,589,254, Cl. 60-286.000.

Kume, Tateo: *See—*
Kume, Satoru; Yoshida, Michiyasu; Konno, Yoshihiro; Kume, Tateo; Takada, Hiroaki; Shinsei, Kiyoichi; Matsumoto, Akio; and Ogawa, Hitoshi, 4,589,254, Cl. 60-286.000.

Kumura, Haruyoshi: *See—*
Abo, Keiju; Kumura, Haruyoshi; Hirano, Hiroyuki; Tanaka, Yoshikazu; Yamamuro, Sigeaki; and Morimoto, Yoshiro, 4,590,561, Cl. 364-424.100.

Kunitani, Miki: *See—*
Sasaki, Yutaka; Utsumi, Hiroshi; Mori, Kunio; Yamamoto, Hiroshi; Nakamura, Yoshimi; Moriya, Kiyoshi; Morii, Akimitsu; Noda, Mikio; and Kunitani, Miki, 4,590,175, Cl. 502-249.000.

Kunreuther and Beringhause: *See—*
Kunreuther, Steven J.; and Roberts, John T., 4,589,583, Cl. 227-43.000.

Kunreuther, Steven J.; and Roberts, John T., to Kunreuther and Beringhause. Automatic hook attaching apparatus. 4,589,583, Cl. 227-43.000.

Kunze, Dieter, to Siemens Aktiengesellschaft. Plastic sealing plugs for cable fittings. 4,590,328, Cl. 174-88.00R.

Kuo, Chung-Ming: *See—*
Bogan, Richard T.; and Kuo, Chung-Ming, 4,590,265, Cl. 536-63.000.

Kuo, Pao-Kuang: *See—*
Thomas, Robert L.; Kuo, Pao-Kuang; and Favro, Lawrence D., 4,589,783, Cl. 374-45.000.

Kurata, Mitsuru: *See—*
Kasama, Nobuhiro; and Kurata, Mitsuru, 4,589,758, Cl. 355-3.0FU.

Kureha Kagaku Kogyo Kabushiki Kaisha: *See—*
Maeda, Yuji; Yamato, Hideyuki; Fujii, Takayoshi; Kobayashi, Yasuhiko; Saito, Kenichi; Kato, Tadaaki; and Yoshikumi, Chikao, 4,590,184, Cl. 514-167.000.

Kurosaki Refractoris Co., Ltd.: *See—*
Hasegawa, Yoshio; Kobori, Takeo; and Fukuda, Kazushige, 4,590,253, Cl. 528-14.000.

Kurtz, Leonard D.; and LiCausi, Joseph, to BioResearch Inc. Hose clamp. 4,589,626, Cl. 251-10.000.

Kurumaji, Masanobu; Sano, Tsutomu; Kondo, Hiroaki; Mizutani, Masao; and Yodono, Kazuei, to Kabushiki Kaisha Kobe Seiko Sho. Hot runners for an injection molding machine. 4,589,839, Cl. 425-547.000.

Kusakabe, Hiromi, to Kabushiki Kaisha Toshiba. Doubled balanced differential amplifier circuit with low power consumption for FM modulation or demodulation. 4,590,433, Cl. 329-50.000.

Kushnick, Julian H.: *See—*
Bedell, John R.; Friedmann, Paul G.; Kushnick, Julian H.; Rosenthal, Eli; Hubbard, James R.; and Zingler, Christian J., 4,589,470, Cl. 164-463.000.

Kusunoki, Hiroyuki: *See—*
Yoshida, Yutaka; Hirayama, Shozo; Kusunoki, Hiroyuki; Shishido, Yoshio; Matsuo, Kazumasa; Mizumoto, Morihide; Kato, Masahiko; and Hagino, Tadao, 4,589,414, Cl. 128-305.000.

Kuwabara, Kouji: *See—*
Kawakubo, Yukio; Sugawara, Hiroyuki; Kuwabara, Kouji; Shirakura, Toshiharu; Takemori, Satoshi; and Sasaki, Kouji, 4,590,599, Cl. 372-87.000.

Kyocera Corporation: *See—*
Nagato, Yoshio, 4,589,917, Cl. 75-238.000.

La Jolla Cancer Research Foundation: *See—*
Pierschbacher, Michael D.; and Ruoslahti, Erkki I., 4,589,881, Cl. 623-11.000.

Laatt, Richard G.; Fiers, Thomas A.; and Andrews, Thomas L., Jr., to Amcodyne Incorporated. Method and apparatus for controlling head movement relative to a disk in an embedded servo system. 4,590,526, Cl. 360-78.000.

Lachiw, Ark; and Stevanovich, Illia M., to Zenith Electronics Corporation. Hinged door for TV control panel. 4,589,228, Cl. 49-386.000.

Laevosan-Gesellschaft m.b.H. & Co. KG: *See—*
Binder, Dieter; and Noe, Christian, 4,590,203, Cl. 514-397.000.

Lahti, Howard R.; and Lahti, Wallace R., to Canadian Patents and Development Limited. System for heating materials with electromagnetic waves. 4,590,348, Cl. 219-10.55M.

Lahti, Wallace R.: *See—*
Lahti, Howard R.; and Lahti, Wallace R., 4,590,348, Cl. 219-10.55M.

L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude: *See—*
Le Diouron, Raymond, 4,589,203, Cl. 29-829.000.
Marhic, Gerard; and Dufour, Eric, 4,590,354, Cl. 219-121.0PM.

Lal, Bansi; Dohadwalla, Alihussein N.; Aroskar, Vijay A.; Dadkar, Nandkumar K.; Dornauer, Horst; Mascarenhas, Julius; and deSouza, Noel J., to Hoechst Aktiengesellschaft. 9,10-substituted 2-mesitylimino-3-alkyl-3,4,6,7-tetra-hydro-2H-pyrimido(6,1-a)isoquinolin-4-ones, and their use as medicaments. 4,590,197, Cl. 514-267.000.

LaMattina, John L.; and Lipinski, Christopher A., to Pfizer Inc. 2-guanidino-4-heteroarylthiazoles. 4,590,299, Cl. 568-415.000.

Lambert, Robert L.; Nagel, Judy A.; and Bergamo, Robert L., to North American Philips Consumer Electronic Corp. Positive-working photoresist composition and method for forming a light-absorbing matrix in a color CRT structure. 4,590,138, Cl. 430-25.000.

Landa, Benzion, to Savin Corporation. Reciprocating optics copier with means for counteracting acceleration reaction forces. 4,589,761, Cl. 355-8.000.

Lang, Aage, to Clean-Tex A/S. Machine to produce mat with valves therein. 4,589,316, Cl. 83-289.000.

Lange, Joachim: *See—*
Maier, Gerhard; and Lange, Joachim, 4,590,611, Cl. 455-166.000.

Langer, Friedrich H.; and Stringfellow, William D., to Weatherford U.S., Inc. Apparatus and method for inserting flow control means into a well casing. 4,589,495, Cl. 166-383.000.

Langevin, Robert Z.: *See—*
Rehklau, George D.; Cotterill, Lee A.; and Langevin, Robert Z., 4,589,608, Cl. 242-195.000.

Langham, Maurice E. Compositions for treatment of ocular hypertension. 4,590,210, Cl. 514-548.000.

Lantrip, Larry J., to Mervyn Shapiro, a part interest. Vehicle protective cover. 4,589,459, Cl. 150-52.00K.

Lanz, Otto; Maschek, Martin; and Mastner, Georg, to BBC Brown, Boveri & Company, Ltd. Analog/digital converter. 4,590,459, Cl. 340-347.0AD.

Lanzer, Heribert: *See—*
Ashikawa, Noboru; Friedrich, Karl; and Lanzer, Heribert, 4,589,304, Cl. 74-701.000.

Lare, Lawrence E., to Rockwell International Corporation. Local area network interface controller. 4,590,467, Cl. 340-825.500.

Larsen, Ib. Electronic measuring and recording apparatus for use in wheeled vehicles. 4,590,571, Cl. 364-467.000.

Laughlin, Donald E.; Wilson, Robert F.; and Drews, Thomas A., to University of Iowa Research Foundation. Catheter for treating arterial occlusion. 4,589,419, Cl. 128-663.000.

Laupenmuhlen, Heinz-Klaus: *See*—
Hacker, Heinz; Ihlein, Walter; Laupenmuhlen, Heinz-Klaus; and Mertens, Willi, 4,590,256, Cl. 528-93.000.

Laurel Bank Machine Co., Ltd.: *See*—
Kokubo, Eiichi; Goi, Koichi; Arikawa, Junichi; Ebihara, Hideyuki; and Chiba, Hiroshi, 4,589,708, Cl. 312-71.000.

Laux, Friedrich-Gunther. Two-armed hand-lever press. 4,589,271, Cl. 72-449.000.

Lawter, Louise M. L.: *See*—
Byrne, Brian; and Lawter, Louise M. L., 4,590,284, Cl. 549-477.000.

Lawton, Robert J., to Hewlett-Packard Company. Vacuum compatible colleting spindle. 4,589,667, Cl. 279-2.00A.

Laycock, John E., to Sundstrand Corporation. Overfill valve. 4,589,524, Cl. 184-103.100.

Lazar, Allan. Changeable labelling system. 4,589,685, Cl. 283-81.000.

Leavitt, Richard P.: *See*—
Wortman, Donald E.; Dropkin, Herbert; and Leavitt, Richard P., 4,590,596, Cl. 372-2.000.

Lebecki, Kazimierz: *See*—
Barton, Piotr; Krzystolik, Pawel; Sliz, Jan; Dworok, Roman; Lebecki, Kazimierz; and Slotwinski, Ryszard, 4,590,373, Cl. 250-308.000.

Le Diouron, Raymond, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Method and apparatus for the cryogenic stripping of electric cables. 4,589,203, Cl. 29-829.000.

Lee, Harry W., Jr.; and Wallace, Joseph W., to Reynolds Metals Company. Hydraulic bottom former. 4,589,270, Cl. 72-348.000.

Lee, Howard M.: *See*—
Scannon, Patrick J.; Spitler, Lynn E.; Lee, Howard M.; Kawahata, Russell T.; and Mischak, Ronald P., 4,590,071, Cl. 424-85.000.

Lee, Shih-Yun: *See*—
Cragle, Linda K.; Harris, Paul C.; Lee, Shih-Yun; Tung, Ker-Kong; and Vodian, Morton A., 4,590,169, Cl. 436-523.000.

Leggett, Leo J.: *See*—
O'Sullivan, Brendan W.; Leggett, Leo J.; and Melvin, Maxwell V., 4,589,370, Cl. 119-4.000.

Legrand, Hubrecht L.; and Ankersmit, Hendrik J. Apparatus for separating from each other the components of a mixture of oil, water and soil. 4,589,984, Cl. 210-522.000.

Lehmann, Helmut: *See*—
Reiter, Udo; and Lehmann, Helmut, 4,590,025, Cl. 264-103.000.

Lehner, August: *See*—
Schornick, Gunnar; Jun, Mong-Jon; Sanner, Axel; Lehner, August; Lenz, Werner; Richter, Peter; and Eckell, Albrecht, 4,590,144, Cl. 430-273.000.

Leiber, Heinz, to Robert Bosch GmbH. All-wheel drive automotive vehicle traction control system. 4,589,511, Cl. 180-197.000.

Leiber, Heinz, to Robert Bosch GmbH. Vehicle brake system for controlling wheel brake slippage and wheel drive slippage. 4,589,706, Cl. 303-114.000.

Le Morvan, Andre : *See*—
Vandenberghe, Claude; and Le Morvan, Andre , 4,590,430, Cl. 324-427.000.

Lenczyk, John P., to B. F. Goodrich Company, The. Process for minimizing corrosion and coking in an ethylene dichloride plant. 4,590,317, Cl. 570-220.000.

Lendl, Joseph, to Triumph-Adler, A.G. Mechanism for raising and transporting of print and correction ribbons. 4,589,788, Cl. 400-187.000.

Lenz, Werner: *See*—
Schornick, Gunnar; Jun, Mong-Jon; Sanner, Axel; Lehner, August; Lenz, Werner; Richter, Peter; and Eckell, Albrecht, 4,590,144, Cl. 430-273.000.

Leonard, David M., to Bry-Air, Inc. Sequenced modular bed carousel dehumidifier. 4,589,892, Cl. 55-162.000.

Leonard, George H., to Airpot Corporation. Variable tension device with adjustable features for spring rate, initial tension and connection to external parts. 4,589,164, Cl. 16-299.000.

Lerner, Hershey; Easter, William M.; and Wehrmann, Rick S., to Automated Packaging Systems, Inc. Apparatus and method for cutting slaughtered poultry into separate pieces. 4,589,165, Cl. 17-11.000.

Leroy, Claude; and Parent, Guy, to Sintra-Alcatel. Acoustic distance measuring apparatus and method of use. 4,590,591, Cl. 367-6.000.

Lesher, George Y.; and Dickinson, William B., to Sterling Drug Inc. 3-[methyl or dimethyl)amino]-6-(pyridinyl)pyridazines and their cardiotonic use. 4,590,194, Cl. 514-247.000.

Lesk, Israel A.; Rice, M. John, Jr.; and Sarma, Kalluri R., to Solavolt International. Silicon deposition process. 4,590,024, Cl. 264-81.000.

Lesnor Maehr Manufacturing Corp.: *See*—
O'Connor, Charles A., 4,589,808, Cl. 409-233.000.

Leuchtenberger, Wolfgang: *See*—
Kula, Maria-Regina; Hummel, Werner; Schutte, Horst; and Leuchtenberger, Wolfgang, 4,590,161, Cl. 435-108.000.

Leupold, Ernst I.; Schmidt, Hans-Joachim; and Wunder, Friedrich, to Hoechst Aktiengesellschaft. Process for the manufacture of acetic acid, acetaldehyde and ethanol. 4,590,217, Cl. 518-716.000.

Lever Brothers Company: *See*—
Pronk, Jacobus N.; Soltau, Martin; and Wieske, Theophil, 4,590,087, Cl. 426-603.000.

Levin, Arthur L.: *See*—
Eilert, John H.; Levin, Arthur L.; and Thomas Julian, 4,590,550, Cl. 364-200.000.

Levin, Jordan, to Fiberite Corporation. High conductivity graphite material with electrically conductive filaments wrapped around warp and fill elements. 4,590,122, Cl. 428-260.000.

Levis, William W., Jr.: *See*—
Korczak, Alexander; and Levis, William W., Jr., 4,590,225, Cl. 521-167.000.

Lewandoske, James W.: *See*—
Meives, Otis E.; and Lewandoske, James W., 4,589,812, Cl. 414-46.000.

Lewis, Jeffrey: *See*—
Rigberg, Allan; and Lewis, Jeffrey, 4,589,575, Cl. 221-198.000.

Leybold Heraeus GmbH: *See*—
Mahler, Peter, 4,589,369, Cl. 118-500.000.

Lhotzky, Kurt: *See*—
Collins, Hans-Jurgen; and Lhotzky, Kurt, 4,589,277, Cl. 73-61.10R.

Li, Tao P., to Monsanto Company. Ammoxidation process. 4,590,011, Cl. 558-323.000.

Librecht, Freddy M.: *See*—
De Schamphelaere, Lucien A.; Librecht, Freddy M.; and Verlinden, Willy G., 4,589,762, Cl. 355-14.00D.

LiCausi, Joseph: *See*—
Kurtz, Leonard D.; and LiCausi, Joseph, 4,589,626, Cl. 251-10.000.

Lieberoth, Dieter: *See*—
Preisler, Eberhard; Debrodt, Heiner; and Lieberoth, Dieter, 4,589,960, Cl. 204-37.100.

Ligtenberg, Hendrikus C. G.; and Veld, Albertus, to Cordis Europa N.V. Apparatus for selectively measuring ions in a liquid. 4,589,970, Cl. 204-406.000.

Lillie, Terrance L., to Pitney Bowes Inc. Method and apparatus for controlling software configurations in data processing systems. 4,590,557, Cl. 364-200.000.

Lim, Drahoslav; and Morris, Peter C., to Barnes-Hind, Inc. Polymerization inhibitors. 4,590,301, Cl. 568-633.000.

Lim, Frank H.: *See*—
Brown, Alfred; Haynes, Stewart; Alves, Gerald W.; and Lim, Frank H., 4,589,486, Cl. 166-252.000.

Lin, Jerhong: *See*—
Rosman, Irwin E.; and Lin, Jerhong, 4,589,176, Cl. 29-156.80B.

Lincoln, James F. L.; Buder, Manfred K.; Brown, Craig A.; Golike, Gregory P.; and Spurrell, Robert M., to Weyerhaeuser Company. Method for reducing comminution energy of a biomass fuel. 4,589,357, Cl. 110-347.000.

Lincoln, James F. L.: *See*—
Adams, Terry N.; Spurrell, Robert M.; Karsner, Grant G.; Golike, Gregory P.; and Lincoln, James F. L., 4,589,356, Cl. 110-347.000.

Lind, Paul U.: *See*—
Beeman, Robert H.; and Lind, Paul U., 4,590,600, Cl. 375-99.000.

Linde Aktiengesellschaft: *See*—
Rebhan, Dieter; and Krumpholz, Hartmut, 4,589,234, Cl. 51-417.000.

Linde, Harold G.; MacIntyre, Michael W.; and Motsiff, William T., to International Business Machines Corporation. Polyamic acid copolymer system for improved semiconductor manufacturing. 4,590,258, Cl. 528-189.000.

Lindley, Andrew A., to Imperial Chemical Industries PLC. Dry film resists containing unsaturated oligomer. 4,590,147, Cl. 430-286.000.

Lindner, Christian: *See*—
Konig, Joachim; Suling, Carlhans; and Lindner, Christian, 4,590,236, Cl. 524-460.000.

Lindner, George H., to M&T Chemicals Inc. Water vapor, reaction rate and deposition rate control of tin oxide film by CVD on glass. 4,590,096, Cl. 427-109.000.

Link, Helmut F.; and Grossmann, Walter, to Index Werke Komm.-Ges Hahn & Tessky. Automatic turret lathe. 4,589,311, Cl. 82-2.500.

Lipinski, Christopher A.: *See*—
LaMattina, John L.; and Lipinski, Christopher A., 4,590,299, Cl. 568-415.000.

Lippman-Milwaukee, Inc.: *See*—
Schuman, LeRoy, 4,589,600, Cl. 241-215.000.

Lisec, Peter. Device for the conveyance of tabular elements. 4,589,541, Cl. 198-468.400.

Litehizer, Melvin P., Jr., to AMP Incorporated. Apparatus for dispensing flat cable assemblies. 4,589,319, Cl. 83-423.000.

Litton Systems, Inc.: *See*—
Schebler, Bernard J.; and Hart, Russell F., 4,589,436, Cl. 137-115.000.

Liu, Chung-Tsing: *See*—
Wolf, Stephen F.; and Liu, Chung-Tsing, 4,590,014, Cl. 260-502.40R.

Liu, Yih H.; and Hour, Jiin Y., to Juan, Ming-Sheng; and Tsai, Ching-Fu. Taper micrometer. 4,589,214, Cl. 33-531.000.

Lloyd, Kenneth, to D.A.B. Industries. Bearing material. 4,590,133, Cl. 428-653.000.

Lob, Heinrich: *See*—
Schreiber, Georg; and Lob, Heinrich, 4,590,038, Cl. 422-142.000.

Locher, Rita: *See*—
Kompis, Ivan; Locher, Rita; and Maag, Hans, 4,590,270, Cl. 544-320.000.

Lofland, James W. Device for aiding in loading of muzzle loading firearms of the flintlock type. 4,589,220, Cl. 42-90.000.

Loge, Hans; Eibofner, Eugen; and Mossle, Walter, to Kaltenbach & Voight GmbH & Co. Tartar-removing dental handpiece. 4,589,847, Cl. 433-126.000.

Long, Alden O., Jr., to AMP Incorporated. Method for replacing contact in a board mounted connector. 4,589,585, Cl. 228-119.000.

Long, Robert A.: *See—*
Burgit, Richard A.; Davis, Newton G.; Goyert, Josita M.; Johnson, Keith, Jr.; Long, Robert A.; and Stachura, Joseph F., 4,589,200, Cl. 29-753.000.

Long-sheng, Ma; Hollberg, Leo; Shirley, Jon H.; and Hall, John L., to United States of America, Commerce. Modulation transfer spectroscopy for stabilizing lasers. 4,590,597, Cl. 372-32.000.

Longhini, David A., to PPG Industries, Inc. Method for producing vinyl chloride. 4,590,318, Cl. 570-220.000.

Loth, Andrew; and Spector, George. Wallpaper trimmer. 4,589,207, Cl. 30-287.000.

Loth, Eric: *See—*
Gogniat, Paul; and Loth, Eric, 4,589,886, Cl. 29-179.000.

Lough, Marvin D.: *See—*
Chatburn, Robert L.; and Lough, Marvin D., 4,589,409, Cl. 128-203.260.

Loukas, Paul W.; Braune, Rudolf E.; and Fischer, Ekkehard, to Advanced Combustion Inc. Heat exchange apparatus for industrial furnaces. 4,589,844, Cl. 432-223.000.

Love, Norman H. Vertical support apparatus. 4,589,351, Cl. 108-111.000.

Lovendusky, Charles M.: *See—*
Houtz, Timothy W.; and Lovendusky, Charles M., 4,589,188, Cl. 29-566.200.

LTV Steel Company, Inc.: *See—*
Gerding, Charles C.; and Majors, Harold L., 4,589,465, Cl. 164-66.100.

Lucas Industries: *See—*
Burrage, Robert G.; Glaze, Stanley G.; and Tipton, James, 4,590,549, Cl. 364-131.000.
Morris, Royston L., 4,589,529, Cl. 188-322.170.

Lucas Industries public limited company: *See—*
Danne, Ulrich W.; and Heibel, Helmut, 4,589,527, Cl. 188-79.5GE.
Timms, Colin T.; and Garrod, James H., 4,589,395, Cl. 123-516.000.

Luccarelli, Domenick, Jr.: *See—*
Pittet, Alan O.; Muralidhara, Ranya; Vock, Manfred H.; Miller, Kevin P.; Luccarelli, Domenick, Jr.; and Wiener, Charles, 4,590,082, Cl. 426-535.000.

Ludikhuize, Adrianus W.: *See—*
Esser, Leonard J. M.; Vaes, Henricus M. J.; and Ludikhuize, Adrianus W., 4,590,509, Cl. 357-53.000.

Luhmann, Erhard; Hoppe, Lutz; and Szablikowski, Klaus, to Wolff Walsrode Aktiengesellschaft. Processes for the production of free-flowing nitrocellulose. 4,590,019, Cl. 264-3.400.

Lukens, H. Richard, to IRT Corporation. In situ isotopic meat grader. 4,590,377, Cl. 250-361.00R.

Lund, Mark A., to Kuebler, Allan J., a part interest. Anti-roll system for a vehicle. 4,589,678, Cl. 280-772.000.

Lur, Hans-Joachim: *See—*
Baatz, Henning; Rittscher, Dieter; and Lur, Hans-Joachim, 4,590,000, Cl. 252-633.000.

Lutes, Charles L., to Sperry Corporation. B_{zz} and B_{yy} sense loop geometries for cylindrical tensor gradiometer loop structures. 4,590,426, Cl. 324-248.000.

Lvovich, Florenty I.: *See—*
Yurkov, Leonid I.; Busse-Machukas, Vladimir B.; Lvovich, Florenty I.; Kubasov, Vladimir L.; Uzbekov, Alexandr A.; Mazanko, Anatoly F.; and Fedotova, Natalya S., 4,589,969, Cl. 204-290.00F.

Lynn, David G.: *See—*
Hecht, Sidney M.; Lynn, David G.; and Reddy, Kalakota S., 4,590,264, Cl. 536-18.200.

M.A.N. Roland Druckmaschinen Aktiengesellschaft: *See—*
Fischer, Hermann, 4,589,339, Cl. 101-217.000.

M&T Chemicals Inc.: *See—*
Lindner, George H., 4,590,096, Cl. 427-109.000.

Maag, Hans: *See—*
Kompis, Ivan; Locher, Rita; and Maag, Hans, 4,590,270, Cl. 544-320.000.

Machado, Octavio J.; and Efferding, Larry E., to Westinghouse Electric Corp. Spent fuel storage cask having improved fins. 4,590,383, Cl. 250-506.100.

Machida, Takayasu: *See—*
Nikaido, Akira; Machida, Takayasu; Hirosawa, Yasuhisa; and Nakajima, Fumio, 4,590,529, Cl. 360-106.000.

Machines Chambon S.A.: *See—*
Hodges, William D., 4,589,863, Cl. 493-471.000.

Machlan, G. Richard: *See—*
Kane, John L.; and Machlan, G. Richard, 4,589,447, Cl. 138-98.000.

MacIntyre, Michael W.: *See—*
Linde, Harold G.; MacIntyre, Michael W.; and Motsiff, William T., 4,590,258, Cl. 528-189.000.

Mack, Russel T., to Dow Chemical Company, The. Portable heat fluxmeter fixtures. 4,589,781, Cl. 374-29.000.

MacLean-Fogg Company: *See—*
Hellon, Keith, 4,589,551, Cl. 206-456.000.

MacLeod, Colin J., to Caledonian Mining Company Ltd. Beam coupling. 4,589,795, Cl. 403-233.000.

MacMillan, John H.: *See—*
Streeter, Bruce E.; MacMillan, John H.; and Bertozzi, Eugene R., 4,590,240, Cl. 525-123.000.

Maderlechner, Gerd: *See—*
Breimesser, Fritz; Hassler, Dietrich; Hundt, Eckart; Maderlechner, Gerd; and Trautenberg, Elmar, 4,589,284, Cl. 73-626.000.

Maeda, Yuji; Yamato, Hideyuki; Fujii, Takayoshi; Kobayashi, Yasuhiko; Saito, Kenichi; Kato, Tadaaki; and Yoshikumi, Chikao, to Kureha Kagaku Kogyo Kabushiki Kaisha. Antiosteoporotic pharmaceutical composition containing 24,25-dihydroxycholecalciferol as an active ingredient. 4,590,184, Cl. 514-167.000.

Magel, Matthias: *See—*
Marx, Karl; Offermann, Peter; Reumann, Ralf-Dieter; Magel, Matthias; Frenzel, Bertram; and Grenzendorfer, Dietmar, 4,589,169, Cl. 19-304.000.

Magnavox Government and Industrial Electronics Company: *See—*
Toone, James R.; and Barker, Robert L., 4,590,590, Cl. 367-4.000.

Mahler, Peter, to Leybold Heraeus GmbH. Device for holding a substrate. 4,589,369, Cl. 118-500.000.

Mahnau, Heinrich: *See—*
Wilhelm, Jurgen; and Mahnau, Heinrich, 4,590,372, Cl. 250-304.000.

Mahr, Peter. Sail cloth. 4,590,121, Cl. 428-258.000.

Maier, Gerhard; and Lange, Joachim, to Deutsche Thomson-Brandt GmbH. Tuner for communications equipment. 4,590,611, Cl. 455-166.000.

Maile, Donald W., to RCA Corporation. Variable input voltage regulator circuit. 4,590,546, Cl. 363-37.000.

Maingaud, Jean-Paul: *See—*
Regnault, Luc; and Maingaud, Jean-Paul, 4,590,483, Cl. 346-1.100.

Maitani, Yoshihisa; Tsunefuji, Katsuhiko; and Yamasaki, Masafumi, to Olympus Optical Co., Ltd. Camera. 4,589,754, Cl. 354-431.000.

Maitani, Yoshihisa; Tsunefuji, Katsuhiko; and Yamasaki, Masafumi, to Olympus Optical Co., Ltd. Camera. 4,589,755, Cl. 354-431.000.

Maitani, Yoshihisa; Tsunefuji, Katsuhiko; and Yamasaki, Masafumi, to Olympus Optical Co., Ltd. Camera. 4,589,757, Cl. 354-458.000.

Maitenaz, Paul; and Gernez, Alain, to Compagnie Europeenne pour l'Equipement Menager "Cepem" . Cooking chamber apparatus. 4,590,360, Cl. 219-390.000.

Majors, Harold L.: *See—*
Gerding, Charles C.; and Majors, Harold L., 4,589,465, Cl. 164-66.100.

Makimoto, Mitsuo: *See—*
Ishigaki, Isao; Makimoto, Mitsuo; and Yamashita, Sadahiko, 4,590,443, Cl. 331-117.00R.

Maloney, John R.; and Ramachandran, Venkataraman, to Ethyl Corporation. Process for preparing alpha arylacrylonitriles. 4,590,013, Cl. 558-332.000.

Maloney, John R.: *See—*
Ramachandran, Venkataraman; Davidson, Robert I.; and Maloney, John R., 4,590,010, Cl. 558-341.000.

Malyshev, Boris N.; Saljuk, Viktor A.; Skobelkin, Oleg X.; Brekhov, Evgeny I.; Smirnov, Boris A.; Korolkov, Ivan A.; Bashilov, Viktor P.; and Ivanova, Tatyana L. Surgical instrument for resection of hollow organs. 4,589,413, Cl. 128-305.000.

Mang, Raymond L., to PPG Industries, Inc. Static charge dissipation circuit with electroconductive wicks. 4,590,535, Cl. 361-218.000.

Mann, Bernd; Schneyer, Gerhard; and Dinkel, Emil, to Brose Fahrzeugteile GmbH & Co. KG. Adjusting transmission in a motor vehicle. 4,589,297, Cl. 74-427.000.

Mann, David B.: *See—*
Meyers, Frederick C.; and Mann, David B., 4,589,312, Cl. 82-47.000.
Meyers, Frederick C.; and Mann, David B., 4,589,313, Cl. 82-63.000.

Mannesmann Aktiengesellschaft: *See—*
Duerwald, Dierk; and Cittrich, Jurgen, 4,589,510, Cl. 180-140.000.

Mansfield, Clifton T.: *See—*
Milhous, Leon A., Jr.; Martin, John M.; and Mansfield, Clifton T., 4,589,775, Cl. 356-439.000.

Mansson, Rune, to AB Zander & Ingestrom. Tube heat exchanger. 4,589,481, Cl. 165-172.000.

Mantec Gesellschaft fur Automatisierungs-und Handhabungssysteme mbH: *See—*
Eberle, Manfred; and Kleemann, Robert, 4,589,816, Cl. 414-680.000.

Manufacture de Machines du Haut-Rhin: *See—*
Edelbruck, Pierre; Melzac, Georges; and Caullet, Bernard, 4,589,554, Cl. 209-546.000.

Manz, Hermann; and Schweiger, Walter, to Siemens Aktiengesellschaft. Carrying handle device for an electrical equipment enclosure with handle stored flush with the enclosure wall and swung up for carrying. 4,589,162, Cl. 16-115.000.

Marchetti, Joseph R.: *See—*
Sanjana, Zal N.; and Marchetti, Joseph R., 4,590,539, Cl. 361-400.000.

Marcoux, Emery. Slicing knife and board. 4,589,206, Cl. 30-114.000.

Mares, Edwin H. Wheeled cart with removable skis. 4,589,668, Cl. 280-8.000.

Marhic, Gerard; and Dufour, Eric, to L'Air Liquide, Societe Anonyme pour l'Etude et l'Exploitation des Procedes Georges Claude. Plasma welding or cutting torch. 4,590,354, Cl. 219-121.0PM.

Marinescu, Stelian: *See—*
Apetrei, Constantin; Slaifer, Sigismund; Vatafu-Gaitan, Laurentiu; Stefanescu, Dumitru; Marinescu, Stelian; and Catana, Marin, 4,589,534, Cl. 192-18.00B.

Marino, Joseph A., Jr.: *See—*
Bellin, Matthew E.; and Marino, Joseph A., Jr., 4,589,872, Cl. 604-246.000.

Marjollet, Jacques: *See—*
Franzolini, Marc; and Marjollet, Jacques, 4,589,893, Cl. 55-269.000.
Mark Controls Corporation: *See—*
Elpiner, Boris, 4,590,576, Cl. 364-510.000.
Markovitz, Alvin; Zehnbauer, Barbara A.; Schoemaker, Joyce M.; and Charette, Marc F., to University Patents, Inc. Enhancement of expression of protein synthesis in *E. coli*. 4,590,159, Cl. 435-68.000.
Marks, Hans-Gunter: *See—*
Schumacher, Hans; Heinrich, Rudolf; and Marks, Hans-Gunter, 4,589,908, Cl. 71-88.000.
Markus, Richard L., to United States Surgical Corporation. Surgical staple remover. 4,589,631, Cl. 254-28.000.
Maron, Robert J.: *See—*
Stone, Frederick A.; and Maron, Robert J., 4,589,187, Cl. 29-458.000.
Maroszek, Raymond V.: *See—*
Brown, Richard K.; and Maroszek, Raymond V., 4,590,349, Cl. 219-10.55E.
Marshell, Edward L. Light switch adapter for toddlers. 4,590,345, Cl. 200-331.000.
Marsili, Leonardo; Falciani, Marco; and Broggi, Renato, to DOBFAR S.p.A. 3-azinomethyl rifamycins. 4,590,185, Cl. 514-183.000.
Martens, Alan; and Myers, Gerry A., to Westinghouse Electric Corp. Adaptive temperature control system for the supply of steam to a steam turbine. 4,589,255, Cl. 60-646.000.
Martens, Jurgen: *See—*
Gunther, Kurt; Martens, Jurgen; and Schickedanz, Maren, 4,590,167, Cl. 436-162.000.
Martin, Frederick W. Achromatic deflector and quadrupole lens. 4,590,379, Cl. 250-396.00R.
Martin, John M.: *See—*
Milhous, Leon A., Jr.; Martin, John M.; and Mansfield, Clifton T., 4,589,775, Cl. 356-439.000.
Martin, Louis G. Hole production tool. 4,589,807, Cl. 408-205.000.
Martin Marietta Corporation: *See—*
Pompea, Stephen M.; Bergener, Derek W.; and Shepard, Donald F., 4,589,972, Cl. 204-29.000.
Martins, Boerge. Fixing member adapted to be clamped on a shaftlike element. 4,589,797, Cl. 403-372.000.
Marx, Karl; Offermann, Peter; Reumann, Ralf-Dieter; Magel, Matthias; Frenzel, Bertram; and Grenzendorfer, Dietmar, to VEB Kombinat Textima. Apparatus for production of a non-woven fabric. 4,589,169, Cl. 19-304.000.
Marx, Matthias: *See—*
Horn, Peter; Bunsch, Hellmut; Hesse, Anton; Marx, Matthias; Nissen, Dietmar; and Heckmann, Walter, 4,590,242, Cl. 525-183.000.
Nissen, Dietmar; Marx, Matthias; and Schmidt, Hans U., 4,590,219, Cl. 521-51.000.
Mas, Antonio S. Apparatus for gathering eggs in bank of cages for chickens. 4,589,371, Cl. 119-48.000.
Mascarenhas, Julius: *See—*
Lal, Bansi; Dohadwalla, Alihussein N.; Aroskar, Vijay A.; Dadkar, Nandkumar K.; Dornauer, Horst; Mascarenhas, Julius; and deSouza, Noel J., 4,590,197, Cl. 514-267.000.
Maschek, Martin: *See—*
Lanz, Otto; Maschek, Martin; and Mastner, Georg, 4,590,459, Cl. 340-347.0AD.
Mase, Toshiyuki: *See—*
Ohashi, Ryutaro; Hasegawa, Hisashi; Miyoshi, Masao; Iida, Hajime; Mase, Toshiyuki; Tanaka, Takashi; Funatsu, Tsunemasa; and Nakanishi, Tami, 4,589,261, Cl. 62-73.000.
Masek, Jaroslav; and Suter, Franz, to BBC Brown, Boveri & Company, Limited. Electro-hydraulic actuator for turbine valves. 4,589,444, Cl. 137-613.000.
Massa, Ronald J.: *See—*
Abbott, Ralph E.; and Massa, Ronald J., 4,590,460, Cl. 340-541.000.
Masters, William E. Open-cockpit kayak. 4,589,365, Cl. 114-347.000.
Mastner, Georg: *See—*
Lanz, Otto; Maschek, Martin; and Mastner, Georg, 4,590,459, Cl. 340-347.0AD.
Masu, Masanobu: *See—*
Sugio, Akitoshi; Masu, Masanobu; Amagai, Akikazu; and Kobayashi, Toshihiko, 4,590,239, Cl. 525-92.000.
Masumoto, Katashi: *See—*
Nishida, Isao; and Masumoto, Katashi, 4,589,918, Cl. 75-244.000.
Mather, T. Paul: *See—*
Phipps, Warren W.; Kee, Richard C. E.; and Mather, T. Paul, 4,589,525, Cl. 188-2.00F.
Mathew, Ranjan: *See—*
Sajja, Vijay M.; and Mathew, Ranjan, 4,589,962, Cl. 204-15.000.
Mathews, H. Wayne: *See—*
Ray, Jimmy C.; and Mathews, H. Wayne, 4,590,336, Cl. 179-175.30A.
Mathews, Ronald D., to Burroughs Corporation. Memory control circuit for subsystem controller. 4,590.551, Cl. 364-200.000.
Mathyssek, Konrad; and Keil, Rudolf, to Siemens Aktiengesellschaft. Method for the manufacturing of a fiber with a tapered end having a refractive lens. 4,589,897, Cl. 65-2.000.
Matisa Materiel Industriel S.A.: *See—*
Hurni, Hans, 4,589,343, Cl. 104-7.00B.
Matschinsky, Wolfgang, to Bayerische Motoren Werke A.G. Suspension for a rigid axle for vehicles. 4,589,677, Cl. 280-726.000.
Matsubayashi, Tadao: *See—*
Nishihashi, Hideji; Matsubayashi, Tadao; Katabami, Tadashi; and Matsuda, Ken-ichi, 4,590,160, Cl. 435-78.000.
Matsuda, Ken-ichi: *See—*
Nishihashi, Hideji; Matsubayashi, Tadao; Katabami, Tadashi; and Matsuda, Ken-ichi, 4,590,160, Cl. 435-78.000.
Matsuda, Norio: *See—*
Hashimoto, Tadanori; Nakano, Kazuhiko; Hama, Masaaki; and Matsuda, Norio, 4,590,053, Cl. 423-344.000.
Hashimoto, Tadanori; Nakano, Kazuhiko; and Matsuda, Norio, 4,590,127, Cl. 428-405.000.
Matsufuji, Yohji: *See—*
Ichihashi, Hiroo; Toganoh, Shigeo; and Matsufuji, Yohji, 4,590,494, Cl. 346-140.00R.
Matsuhashi, Hajime: *See—*
Mayumi, Nobuo; Kato, Hidetoshi; and Matsuhashi, Hajime, 4,590,414, Cl. 320-64.000.
Matsui, Kazuhiro: *See—*
Sugiura, Haruyuki; Hayashi, Yoshitoki; and Matsui, Kazuhiro, 4,589,794, Cl. 403-187.000.
Matsukawa, Hiroharu: *See—*
Akiyoshi, Yutaka; Kobayashi, Shinzo; Kakimi, Fujio; and Matsukawa, Hiroharu, 4,590,170, Cl. 436-533.000.
Matsuki, Toshio, to Canon Kabushiki Kaisha. Exposure apparatus. 4,589,769, Cl. 355-71.000.
Matsumoto, Akio: *See—*
Kume, Satoru; Yoshida, Michiyasu; Konno, Yoshihiro; Kume, Tateo; Takada, Hiroaki; Shinsei, Kiyoichi; Matsumoto, Akio; and Ogawa, Hitoshi, 4,589,254, Cl. 60-286.000.
Matsumoto, Kouichi: *See—*
Hamano, Isao; Morishita, Akira; Akae, Yoshifumi; Tanaka, Toshinori; Matsumoto, Kouichi; Gotou, Takeo; and Yabunaka, Kiyoshi, 4,590,385, Cl. 290-38.00E.
Matsumoto, Toru: *See—*
Yamazaki, Masuo; Matsumoto, Toru; Wakamiya, Katsutoshi; Ohsaki, Ichiro; Nakahara, Toshiaki; and Ushiyama, Hisayuki, 4,590,142, Cl. 430-138.000.
Matsumura, Toshimi; Omori, Norio; and Kobayashi, Hisanori, to Nippondenso Co., Ltd. Method and apparatus for controlling internal combustion engine. 4,590,563, Cl. 364-431.050.
Matsuo, Kazumasa: *See—*
Yoshida, Yutaka; Hirayama, Shozo; Kusunoki, Hiroyuki; Shishido, Yoshio; Matsuo, Kazumasa; Mizumoto, Morihide; Kato, Masahiko; and Hagino, Tadao, 4,589,414, Cl. 128-305.000.
Matsuoka, Nobuo: *See—*
Ikeda, Yoshinori; and Matsuoka, Nobuo, 4,590,514, Cl. 358-75.000.
Matsushita Electric Industrial Co., Ltd.: *See—*
Gamo, Takaharu; Moriwaki, Yoshio; Tagashira, Minoru; and Mitsumata, Tadayasu, 4,589,479, Cl. 165-104.120.
Honjo, Masahiro; Tomita, Masao; and Kobayashi, Masaaki, 4,590,523, Cl. 360-10.300.
Inoue, Takao; and Yoshimura, Munehiro, 4,590,493, Cl. 346-135.100.
Ishigaki, Isao; Makimoto, Mitsuo; and Yamashita, Sadahiko, 4,590,443, Cl. 331-117.00R.
Sakakima, Hiroshi; Satomi, Mitsuo; Yanagiuchi, Yukihiro; and Senno, Harufumi, 4,590,530, Cl. 360-122.000.
Takahashi, Shozo; Yoshimura, Susumu; and Ozaki, Junji, 4,590,541, Cl. 361-433.000.
Ueda, Shigeki, 4,590,350, Cl. 219-10.55B.
Matsushita Electric Works, Ltd.: *See—*
Iwasaki, Juzaemon; and Ihara, Shinji, 4,589,208, Cl. 30-376.000.
Tanahashi, Masao, 4,589,205, Cl. 30-43.800.
Matsushita, Yoh, to Ricoh Company, Ltd. Thermal recording head driving control system. 4,590,484, Cl. 346-76.0PH.
Mattei, Riccardo, to G.D. Societa per Azioni. Continuous-rod cigarette manufacturing machine. 4,589,426, Cl. 131-84.300.
Mattison, Robert N. Fishing lure and entrapment device. 4,589,221, Cl. 43-17.600.
Maul, James J.; and Tang, David Y., to Occidental Chemical Corporation. Process for the preparation of halo aromatic compounds. 4,590,315, Cl. 570-127.000.
May, Adolf: *See—*
Rieck, Hans-Peter; Kalz, Hans-Jurgen; May, Adolf; Quack, Jochen M.; and Bucking, Hans-Walter, 4,589,988, Cl. 252-8.800.
May, Ronald N.: *See—*
Brown, James P.; Carroll, William G.; May, Ronald N.; Merckx, Erik M. B.; and Sparrow, David J., 4,590,226, Cl. 521-174.000.
Mayeaux, Donald P., to Permutit Company, The. Moisture analyzer. 4,589,971, Cl. 204-430.000.
Mayhan, Kenneth G.; Janssen, Robert A.; and Bertrand, William J., to American Hospital Supply Corporation. Process for graft copolymerization of a pre-formed substrate. 4,589,964, Cl. 522-85.000.
Mays, Joe A., to Systems Research Laboratories, Inc. Linear/resonant CRT beam deflection circuit. 4,590,408, Cl. 315-403.000.
Maytum, Michael J., to Texas Instruments Incorporated. A.C. supply converter. 4,590,548, Cl. 363-161.000.
Mayumi, Nobuo; Kato, Hidetoshi; and Matsuhashi, Hajime, to Nippondenso Co., Ltd. Battery voltage regulation system. 4,590,414, Cl. 320-64.000.
Mazanko, Anatoly F.: *See—*
Yurkov, Leonid I.; Busse-Machukas, Vladimir B.; Lvovich, Florenty I.; Kubasov, Vladimir L.; Uzbekov, Alexandr A.; Mazanko, Anatoly F.; and Fedotova, Natalya S., 4,589,969, Cl. 204-290.00F.
Mazda Motor Corporation: *See—*
Oda, Hiroyuki; Yokooku, Katsuhiko; Seo, Nobuhide; and Shiraishi, Hideo, 4,589,302, Cl. 74-866.000.

Tokushima, Takashige; Okitsu, Kingo; Mochizuki, Yoshiyuki; and Tsuji, Kouji, 4,589,396, Cl. 123-559.000.

Mazziotti, Michael F.; and Mazziotti, Philip J., to Zeller Corporation, The. Tripot universal joint of the end motion type. 4,589,856, Cl. 464-111.000.

Mazziotti, Philip J.: *See*—
Mazziotti, Michael F.; and Mazziotti, Philip J., 4,589,856, Cl. 464-111.000.

McAllister, Jack G. Geometric frame assembly. 4,589,236, Cl. 52-81.000.

McCarthy, Robert E., to University of Nebraska, Board of Regents of the. Synthetic immunoregulators and methods of use and preparation. 4,590,181, Cl. 514-54.000.

McClintock, Kenneth R.: *See*—
Moore, Richard B.; and McClintock, Kenneth R., 4,589,809, Cl. 411-166.000.

McCord, Wilfred M., Jr., to Vermont American Corporation. Multiple saw blade adjustable dado cutter. 4,589,458, Cl. 144-238.000.

McDonald, Theodore R.; and Hetzner, Randall H., to Fischer-Flack, Inc. Container counting apparatus. 4,590,364, Cl. 235-98.00C.

McElroy, Lucian G.: *See*—
Day, David R.; and McElroy, Lucian G., 4,589,160, Cl. 15-316.00R.

McGee, Daniel P. C.: *See*—
Prisbe, Ernest J.; and McGee, Daniel P. C., 4,590,269, Cl. 544-276.000.

McGill, Lee E., to Miles Laboratories, Inc. Device for holding and positioning tubing of I.V. administration set. 4,589,171, Cl. 24-543.000.

McGrew, Stephen P. Anticounterfeiting method and device. 4,589,686, Cl. 283-85.000.

McGuire, Thomas L.; and Steinberg, Robert M. Integral multiple use message unit package and method of making it. 4,589,590, Cl. 229-92.800.

McKeough, David T.: *See*—
Chang, Wen-Hsuan; McKeough, David T.; and Chau, Michael M., 4,590,254, Cl. 528-49.000.

McKesson Corporation: *See*—
Harris, Robert M., Jr., 4,589,560, Cl. 215-1.00C.

McLeish, James G.: *See*—
Meloche, Kenneth R.; McLeish, James G.; Bach, Douglas R.; and Buchanan, Harry C., Jr., 4,589,676, Cl. 280-707.000.

Mead Corporation, The: *See*—
Gebhardt, James L.; Hanna, James; and Whiten, Douglas, 4,589,349, Cl. 108-102.000.
Wood, Prentice J., 4,589,246, Cl. 53-491.000.

Medical Dynamics, Inc.: *See*—
Barath, James D.; and Case, Steven K., 4,589,404, Cl. 128-6.000.

Medical Engineering Corporation: *See*—
Carter, Garry L., 4,589,280, Cl. 73-226.000.

Medichemie AG: *See*—
Widauer, Josef O., 4,590,191, Cl. 514-221.000.

Mediplast AB: *See*—
Wernborg, Rune, 4,589,869, Cl. 604-119.000.

Mehren, Herbert: *See*—
Braun, Dieter; and Mehren, Herbert, 4,589,675, Cl. 280-707.000.

Meier, Michael J., to United States of America, Air Force. High resolution optical fiber print head. 4,590,492, Cl. 346-107.00R.

Meiji Milk Products Company Limited: *See*—
Takahashi, Yasuyuki; Yoshida, Toshiro; and Takahashi, Takeshi, 4,590,086, Cl. 426-602.000.

Meisner, Lorraine F., to Peritain, Ltd. Treatment for periodontal disease. 4,590,067, Cl. 424-54.000.

Meives, Otis E.; and Lewandoske, James W., to Pemco, Inc. Method of and apparatus for stacking reams of paper sheets. 4,589,812, Cl. 414-46.000.

Mellors, Geoffrey W., to Union Carbide Corporation. Process for the production of manganese dioxide. 4,590,059, Cl. 423-605.000.

Meloche, Kenneth R.; McLeish, James G.; Bach, Douglas R.; and Buchanan, Harry C., Jr., to General Motors Corporation. Adaptive ride control for motor vehicle. 4,589,676, Cl. 280-707.000.

Melvin, Maxwell V.: *See*—
O'Sullivan, Brendan W.; Leggett, Leo J.; and Melvin, Maxwell V., 4,589,370, Cl. 119-4.000.

Melzac, Georges: *See*—
Edelbruck, Pierre; Melzac, Georges; and Caullet, Bernard, 4,589,554, Cl. 209-546.000.

Mencke, Burkhard: *See*—
Scheunemann, Karl-Heinz; Mencke, Burkhard; Blumbach, Jurgen; Durckheimer, Walter; and Fleischmann, Klaus, 4,590,267, Cl. 544-27.000.

Mendelson, Max, to Pineapple Industries, Inc. Phosphorescent marking system. 4,590,381, Cl. 250-484.100.

Mendez, Francisco R.: *See*—
Sanchez Aguilar, Ricardo B.; Mendez, Francisco R.; Equihua Zamora, Luis F.; and Soto Curiel, Carlos D., 4,589,445, Cl. 137-616.700.

Mendiratta, Ashok K., to General Electric Company. Method for making bisphenol. 4,590,303, Cl. 568-728.000.

Mennicke, Stefan: *See*—
Buehler, Werner; Mennicke, Stefan; Reiss, Karl; and Terharn, Susanne, 4,590,136, Cl. 429-104.000.

Mercer, Frank B., to P. L. G. Research Limited. Molecularly orientating plastics material. 4,590,029, Cl. 264-156.000.

Merck & Co., Inc.: *See*—
Bochis, Richard J.; Chabala, John C.; and Fisher, Michael H., 4,590,201, Cl. 514-359.000.
King, Stella W., 4,590,276, Cl. 546-75.000.
Remy, David C., 4,590,202, Cl. 514-392.000.

Merck Patent Gesellschaft mit beschrankter Haftung: *See*—
Irmscher, Klaus; Jonas, Rochus; Uhl, Jurgen; and Schorscher, Ernst, 4,590,180, Cl. 514-46.000.

Merckx, Erik M. B.: *See*—
Brown, James P.; Carroll, William G.; May, Ronald N.; Merckx, Erik M. B.; and Sparrow, David J., 4,590,226, Cl. 521-174.000.

Mertens, Willi: *See*—
Hacker, Heinz; Ihlein, Walter; Laupenmuhlen, Heinz-Klaus; and Mertens, Willi, 4,590,256, Cl. 528-93.000.

Mervyn Shapiro: *See*—
Lantrip, Larry J., 4,589,459, Cl. 150-52.00K.

Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung: *See*—
Kranz, Walter, 4,589,594, Cl. 239-265.250.
Wackerle, Peter; Schulz, Ralf-Thilo; Sperber, Franz; Koletzko, Wolfram; and Prochaska, Wolfgang, 4,589,679, Cl. 280-777.000.

Metabi, Tsuneyo, to Minolta Camera Kabushiki Kaisha. Attachment device for interchangeable optical device. 4,589,751, Cl. 354-295.000.

Metzeler Kautschuk GmbH: *See*—
Hofmann, Manfred; and Klockner, Karl-Heinz, 4,589,638, Cl. 267-8.00R.

Meuleman, Guy A., to Aqua Control, Inc. Seal for irrigation valve. 4,589,690, Cl. 285-162.000.

Meyer, John D.: *See*—
Dyott, Richard B.; Ulrich, Reinhard; and Meyer, John D., 4,589,728, Cl. 350-96.300.

Meyer, Richard C.; and Pang, Wing S., to Beckman Instruments, Inc. Zero backlash drive mechanism. 4,589,298, Cl. 74-441.000.

Meyer, Walter E.: *See*—
Hagen, James P.; and Meyer, Walter E., 4,589,813, Cl. 414-401.000.

Meyers, Frederick C.; and Mann, David B., to Joanna Western Mills Company. Automatic shade cutter. 4,589,312, Cl. 82-47.000.

Meyers, Frederick C.; and Mann, David B., to Joanna Western Mills Company. Automatic shade cutter. 4,589,313, Cl. 82-63.000.

Miale, Joseph N.: *See*—
Chang, Clarence D.; and Miale, Joseph N., 4,590,050, Cl. 423-305.000.

Mibae, Jiro: *See*—
Taniguchi, Takashi; and Mibae, Jiro, 4,590,117, Cl. 428-212.000.

Michaelson, Wayne A.: *See*—
Zenk, Daniel K.; and Michaelson, Wayne A., 4,590,586, Cl. 364-900.000.

Michaux, Jacques. Device for moving and axially adjusting horizontal rolls of a section rolling mill stand. 4,589,269, Cl. 72-247.000.

MICI Limited Partnership IV: *See*—
Clausen, Earl W.; and Hubbard, Lloyd C., 4,589,822, Cl. 415-170.00A.

Middlehurst, Richard J.: *See*—
Aujla, Sharanjit S.; Middlehurst, Richard J.; and Simpson, John P., 4,589,720, Cl. 339-147.00R.

Miettaux, Marc: *See*—
Jourde, Jean-Pierre; and Miettaux, Marc, 4,589,393, Cl. 123-460.000.

Miles Laboratories, Inc.: *See*—
McGill, Lee E., 4,589,171, Cl. 24-543.000.

Milhous, Leon A., Jr.; Martin, John M.; and Mansfield, Clifton T., to R. J. Reynolds Tobacco Company. Apparatus and method for accumulating and measuring sidestream smoke produced by a smoking material. 4,589,775, Cl. 356-439.000.

Miller, Birgit J.; Bell, Harvey; and Wojcak, Eugene, to National Starch and Chemical Corporation. Retorted paste products containing high amylose starch. 4,590,084, Cl. 426-557.000.

Miller Brewing Company: *See*—
Cowles, John M.; Goldstein, Henry; Chicoye, Etzer; and Ting, Patrick L., 4,590,296, Cl. 568-366.000.

Miller, Hubert A., to AT&T Bell Laboratories. Coin telephone measurement circuitry. 4,590,583, Cl. 364-724.000.

Miller, Kevin P.: *See*—
Pittet, Alan O.; Muralidhara, Ranya; Vock, Manfred H.; Miller, Kevin P.; Luccarelli, Domerick, Jr.; and Wiener, Charles, 4,590,082, Cl. 426-535.000.

Miller, Larry S. Endotrachael tube. 4,589,410, Cl. 128-207.150.

Miller, Roy W., to Pullman Standard, Inc. Axle stop arrangement for single axle wheel truck for a skeleton type railway car. 4,589,346, Cl. 105-171.000.

Milligan, Vernon C., to Pacific Western Systems, Inc. Automatic wafer prober having a probe scrub routine. 4,590,422, Cl. 324-158.00F.

Milliken Research Corporation: *See*—
Gilpatrick, Michael W., 4,589,884, Cl. 8-481.000.

Milliman, Keith, to Coleman Company, Inc., The. Adjustable cheekpiece for gunstock. 4,589,219, Cl. 42-73.000.

Mills, William R., Jr.; and Allen, Linus S., to Mobil Oil Corporation. Epithermal neutron die-away logging. 4,590,370, Cl. 250-267.000.

Milly, John J. Drainage system. 4,589,798, Cl. 405-36.000.

Milner, David J.: *See*—
Costello, Alan T.; and Milner, David J., 4,590,308, Cl. 568-812.000.

Milpat Corporation: *See*—
Spitz, Albert W., 4,590,048, Cl. 423-242.000.

Minagawa, Ryuji: *See*—
Akiba, Masashi; Minagawa, Ryuji; and Mori, Sumio, 4,589,256, Cl. 60-660.000.

Minami, Toshiaki: *See*—
Fujimura, Fumio; Satake, Toshimi; Mori, Manabu; Minami, Toshiaki; and Fukuchi, Tadakazu, 4,590,499, Cl. 346-209.000.
Minden, Carl S., to Breckinridge Minerals, Inc. Process for recovering oil from raw oil shale using added pulverized coal. 4,589,973, Cl. 208-410.000.
Minderhoud, Johannes K.: *See*—
Hoek, Arend; Post, Martin F. M.; and Minderhoud, Johannes K., 4,590,176, Cl. 502-307.000.
Minnesota Mining and Manufacturing Co.: *See*—
Gin, Vincent M.; and Tharp, Gene E., 4,589,894, Cl. 55-274.000.
Turgeon, Thomas A., 4,589,714, Cl. 339-14.00R.
Minolta Camera Kabushiki Kaisha: *See*—
Kondo, Takashi, 4,590,512, Cl. 358-29.000.
Metabi, Tsuneyo, 4,589,751, Cl. 354-295.000.
Mischak, Ronald P.: *See*—
Scannon, Patrick J.; Spitler, Lynn E.; Lee, Howard M.; Kawahata, Russell T.; and Mischak, Ronald P., 4,590,071, Cl. 424-85.000.
Misera, Erich; Floh, Hubert; and Haargassner, Reinhard, to Voest-Alpine International Corporation. Continuous mold for a continuous casting plant. 4,589,468, Cl. 164-418.000.
Mita Industrial Co., Ltd.: *See*—
Miyoshi, Yoshitake, 4,589,650, Cl. 271-242.000.
Mitchell, Phillip G. Stirring device for sand mill. 4,589,778, Cl. 366-316.000.
Mitchell, Thomas A., Jr. Control apparatus for a combine. 4,589,425, Cl. 130-27.0HF.
Mitrani, Sem, to Beghin-Say S.A. Disposable diaper. 4,589,878, Cl. 604-392.000.
Mitsubishi Chemical Industries, Ltd.: *See*—
Imaki, Naoshi; and Fukumoto, Yoshiko, 4,590,319, Cl. 585-274.000.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Hamano, Isao; Morishita, Akira; Akae, Yoshifumi; Tanaka, Toshinori; Matsumoto, Kouichi; Gotou, Takeo; and Yabunaka, Kiyoshi, 4,590,385, Cl. 290-38.00E.
Imanishi, Kazuo, 4,590,572, Cl. 364-474.000.
Iwaki, Yoshiyuki; and Katashima, Tadashi, 4,590,415, Cl. 320-64.000.
Kume, Satoru; Yoshida, Michiyasu; Konno, Yoshihiro; Kume, Tateo; Takada, Hiroaki; Shinsei, Kiyoichi; Matsumoto, Akio; and Ogawa, Hitoshi, 4,589,254, Cl. 60-286.000.
Murata, Masanori, 4,590,533, Cl. 361-91.000.
Ogawa, Hitoshi, 4,589,829, Cl. 418-259.000.
Tsubouchi, Natsuro; and Denda, Masahiko, 4,589,189, Cl. 29-571.000.
Mitsubishi Gas Chemical Company, Inc.: *See*—
Sugio, Akitoshi; Masu, Masanobu; Amagai, Akikazu; and Kobayashi, Toshihiko, 4,590,239, Cl. 525-92.000.
Mitsubishi Jidosha Kogyo Kabushiki Kaisha: *See*—
Kume, Satoru; Yoshida, Michiyasu; Konno, Yoshihiro; Kume, Tateo; Takada, Hiroaki; Shinsei, Kiyoichi; Matsumoto, Akio; and Ogawa, Hitoshi, 4,589,254, Cl. 60-286.000.
Mitsubishi Paper Mills, Ltd.: *See*—
Kanada, Eiji; Kondo, Toshiro; and Isobe, Kenichi, 4,589,920, Cl. 106-30.000.
Mitsuboshi Belting Ltd.: *See*—
Tanaka, Toshihiro; Yoshimi, Keiichi; and Goto, Shigeo, 4,589,941, Cl. 156-140.000.
Mitsuhashi, Yasuo; Takenouchi, Masanori; Tajima, Hatsuo; Uchiyama, Masaki; Urawa, Motoo; and Okado, Kenji, to Canon Kabushiki Kaisha. Toner application method and treated magnetic particles for use therein. 4,590,140, Cl. 430-102.000.
Mitsui Toatsu Chemicals, Incorporated: *See*—
Kamada, Keiichi; Iiyama, Katuaki; Yano, Yasushi; and Itoh, Isao, 4,590,230, Cl. 524-77.000.
Mitsumata, Tadayasu: *See*—
Gamo, Takaharu; Moriwaki, Yoshio; Tagashira, Minoru; and Mitsumata, Tadayasu, 4,589,479, Cl. 165-104.120.
Mitsuyasu, Masaki; Takimoto, Toshiyuki; and Aoki, Keiji, to Toyota Jidosha Kabushiki Kaisha. Apparatus and method for detecting intake air mass flow rate. 4,589,279, Cl. 73-118.000.
Miura, Seishi; and Tsukui, Takaaki, to Honda Giken Kogyo Kabushiki Kaisha. Valve operating device with stopping function for internal combustion engine. 4,589,387, Cl. 123-198.00F.
Miyakawa, Hideaki: *See*—
Seki, Mitsuaki; Watanabe, Satoshi; and Miyakawa, Hideaki, 4,589,787, Cl. 400-145.200.
Miyamoto, Motomu, to SUN-S Company Ltd. Interlocking contactor assembly. 4,590,451, Cl. 335-161.000.
Miyatake, Satoshi: *See*—
Yonemura, Shigehiro; Umino, Hiroshi; Kume, Masao; Abe, Mitsuo; and Miyatake, Satoshi, 4,589,230, Cl. 51-95.0GH.
Miyazawa, Masanori: *See*—
Sawada, Takehiko; Miyazawa, Masanori; and Kikuchi, Noriyuki, 4,590,081, Cl. 426-448.000.
Miyoshi, Masao: *See*—
Ohashi, Ryutaro; Hasegawa, Hisashi; Miyoshi, Masao; Iida, Hajime; Mase, Toshiyuki; Tanaka, Takashi; Funatsu, Tsunemasa; and Nakanishi, Tami, 4,589,261, Cl. 62-73.000.
Miyoshi, Yoshitake, to Mita Industrial Co., Ltd. Paper feeding device. 4,589,650, Cl. 271-242.000.
Mizoguchi, Hiroaki; Hayashibara, Toshio; Shitara, Tadashi; Katano, Sigeyuki; and Kume, Hideo, to Hitachi, Ltd. Electric motor fan. 4,589,827, Cl. 417-423.00R.
Mizukami, Etsuo: *See*—
Ohno, Youzi; Sato, Yoshiaki; Yamashita, Yoshito; and Mizukami, Etsuo, 4,589,455, Cl. 141-311.00R.
Mizumoto, Morihide: *See*—
Yoshida, Yutaka; Hirayama, Shozo; Kusunoki, Hiroyuki; Shishido, Yoshio; Matsuo, Kazumasa; Mizumoto, Morihide; Kato, Masahiko; and Hagiao, Tadao, 4,589,414, Cl. 128-305.000.
Mizuno Corporation: *See*—
Hayashi, Keijiro; Awano, Toshimi; and Asai, Shigeru, 4,590,023, Cl. 264-46.500.
Mizutani, Masao: *See*—
Kurumaji, Masanobu; Sano, Tsutomu; Kondo, Hiroaki; Mizutani, Masao; and Yodono, Kazuei, 4,589,839, Cl. 425-547.000.
Mobil Oil Corporation: *See*—
Balloni, Riccardo; and Keung, Jay, 4,590,125, Cl. 428-349.000.
Bowman, Bonita F.; Pann, Keh; and Redeker, Maynard S., 4,590,592, Cl. 367-68.000.
Chang, Clarence D.; and Miale, Joseph N., 4,590,050, Cl. 423-305.000.
Chu, Chin-Chiun, 4,590,321, Cl. 585-415.000.
Chu, Chin-Chiun, 4,590,322, Cl. 585-415.000.
Chu, Chin-Chiun, 4,590,323, Cl. 585-417.000.
Djabbarah, Nizar F., 4,589,276, Cl. 73-60.100.
Green, Gary J.; and Yan, Tsoung Y., 4,589,978, Cl. 208-113.000.
Mills, William R., Jr.; and Allen, Linus S., 4,590,370, Cl. 250-267.000.
Sapre, Ajit V., 4,590,320, Cl. 585-324.000.
Venkatesan, Valadi N.; and Venuto, Paul B., 4,589,487, Cl. 166-261.000.
Mobius, Ulrich. Heating for a car seat. 4,590,359, Cl. 219-217.000.
Mochizuki, Yoshiyuki: *See*—
Tokushima, Takashige; Okitsu, Kingo; Mochizuki, Yoshiyuki; and Tsuji, Kouji, 4,589,396, Cl. 123-559.000.
Moessinger, Albert; and Angebault, Joel, to Societe Alsacienne de Construction de Material Textile. Weft measuring device for weaving loom. 4,589,451, Cl. 139-452.000.
Mohebban, Manoochehr; Versteegh, Willem M.; and Toy, Lester T., to Raychem Corporation. Insulating multiple-conductor cables using coated insert means. 4,589,939, Cl. 156-49.000.
Mokdad, Mohamed; and Xuan, Mai T., to Omega SA. Method of energizing a stepping motor. 4,590,412, Cl. 318-696.000.
Moller, Klaus: *See*—
Goldbeck, Heinz; Plassmeier, Horst; and Moller, Klaus, 4,589,358, Cl. 112-68.000.
Monkelbaan, Edwin R.: *See*—
Fantuzzo, Joseph; Monkelbaan, Edwin R.; and Till, Henry R., 4,589,759, Cl. 355-8.000.
Monsanto Company: *See*—
Gabbert, James D.; Garner, Albert Y.; and Hedrick, Ross M., 4,590,243, Cl. 525-184.000.
Gabbert, James D.; Garner, Albert Y.; and Hedrick, Ross M., 4,590,244, Cl. 525-332.300.
Knapczyk, Jerome W., 4,590,101, Cl. 427-350.000.
Li, Tao P., 4,590,011, Cl. 558-323.000.
Montagna, Angelo A.: *See*—
Richard, Michael A.; Vanderspurt, Thomas H.; and Montagna, Angelo A., 4,590,177, Cl. 502-328.000.
Montres Rado S.A.: *See*—
Gogniat, Paul; and Loth, Eric, 4,589,886, Cl. 29-179.000.
Moore, Richard B.; and McClintock, Kenneth R. Stud fastener. 4,589,809, Cl. 411-166.000.
Moorehead, Robert M., to Amon, Glen C.; and Ardinger, Horace T., Jr. Oil leakage detection apparatus. 4,590,462, Cl. 340-605.000.
Moraly, Paul. Tool for driving in and guiding pegs for fixing stakes. 4,589,500, Cl. 173-90.000.
Morawski, Jean-Claude: *See*—
Chevallier, Yvonick; and Morawski, Jean-Claude, 4,590,052, Cl. 423-335.000.
Morgan Corporation: *See*—
Curran, Barry D., 4,589,507, Cl. 177-138.000.
Morguet, Hermann; Hobes, John; Spaleck, Walter; and Payer, Wolfgang, to Ruhrchemie Aktiengesellschaft. Process for the homo- and copolymerization of ethylene. 4,590,247, Cl. 526-124.000.
Mori, Kei. Solar ray collecting device. 4,589,400, Cl. 126-440.000.
Mori, Kunio: *See*—
Sasaki, Yutaka; Utsumi, Hiroshi; Mori, Kunio; Yamamoto, Hiroshi; Nakamura, Yoshimi; Moriya, Kiyoshi; Morii, Akimitsu; Noda, Mikio; and Kunitani, Miki, 4,590,175, Cl. 502-249.000.
Mori, Manabu: *See*—
Fujimura, Fumio; Satake, Toshimi; Mori, Manabu; Minami, Toshiaki; and Fukuchi, Tadakazu, 4,590,499, Cl. 346-209.000.
Mori, Mituyoshi, to Kabushiki Kaisha Daikin Seisakusho. Emergency PTO driving unit. 4,589,293, Cl. 74-15.600.
Mori, Sumio: *See*—
Akiba, Masashi; Minagawa, Ryuji; and Mori, Sumio, 4,589,256, Cl. 60-660.000.
Moriarty, John K., Jr., to General Motors Corporation. Circuit for generating a temperature stabilized reference voltage. 4,590,418, Cl. 323-313.000.
Moriarty, John K., Jr., to General Motors Corporation. Circuit for generating a temperature-stabilized reference voltage. 4,590,419, Cl. 323-313.000.
Moriguchi, Haruhiko: *See*—
Noguchi, Akio; Moriguchi, Haruhiko; Inui, Toshiharu; and Hisatake, Masayuki, 4,590,487, Cl. 346-76.0PH.

Morii, Akimitsu: *See*—
Sasaki, Yutaka; Utsumi, Hiroshi; Mori, Kunio; Yamamoto, Hiroshi; Nakamura, Yoshimi; Moriya, Kiyoshi; Morii, Akimitsu; Noda, Mikio; and Kunitani, Miki, 4,590,175, Cl. 502-249.000.

Morimoto, Yoshiro: *See*—
Abo, Keiju; Kumura, Haruyoshi; Hirano, Hiroyuki; Tanaka, Yoshikazu; Yamamuro, Sigeaki; and Morimoto, Yoshiro, 4,590,561, Cl. 364-424.100.

Morimura, Yo. Apparatus for detecting in-band single frequency signaling tones from FDM channels. 4,590,595, Cl. 370-76.000.

Morisawa, Tahei: *See*—
Tomori, Yasumasa; Okudaira, Sadao; Aoki, Harumi; Urano, Fumio; and Morisawa, Tahei, 4,589,750, Cl. 354-271.100.

Morishita, Akira: *See*—
Hamano, Isao; Morishita, Akira; Akae, Yoshifumi; Tanaka, Toshinori; Matsumoto, Kouichi; Gotou, Takeo; and Yabunaka, Kiyoshi, 4,590,385, Cl. 290-38.00E.

Morita Fire Pump Mfg. Co., Ltd.: *See*—
Kohzai, Tetsuo; Murai, Naoyuki; and Yamasaki, Masayoshi, 4,589,518, Cl. 182-2.000.

Morita, Kousaku: *See*—
Yahagi, Masakichi; Igaki, Tetsuo; Yosinaka, Sinzi; Morita, Kousaku; Saito, Morikuni; and Kinoshita, Kimiaki, 4,590,498, Cl. 346-208.000.

Morita, Yoshiharu, to Ricoh Co., Ltd. Toner vessel for copying machine. 4,589,579, Cl. 222-561.000.

Moriwaki, Yoshio: *See*—
Gamo, Takaharu; Moriwaki, Yoshio; Tagashira, Minoru; and Mitsumata, Tadayasu, 4,589,479, Cl. 165-104.120.

Moriya, Kiyoshi: *See*—
Sasaki, Yutaka; Utsumi, Hiroshi; Mori, Kunio; Yamamoto, Hiroshi; Nakamura, Yoshimi; Moriya, Kiyoshi; Morii, Akimitsu; Noda, Mikio; and Kunitani, Miki, 4,590,175, Cl. 502-249.000.

Moriya, Yasuo; and Kagei, Kazunori, to Nippon Oil and Fats Co., Ltd.; and Asahi Optical Co., Ltd. Method for producing a plastic lens using tertiary alkyl peroxy allyl carbonate. 4,590,248, Cl. 526-228.000.

Moriyama, Noboru: *See*—
Fukumoto, Yasuhisha; Moriyama, Noboru; and Itoi, Takashi, 4,589,995, Cl. 252-180.000.

Morkoc, Hadis, to University of Illinois. Camel gate field effect transistor device. 4,590,502, Cl. 357-22.000.

Moroi, Shiro: *See*—
Kita, Yasushi; Nakano, Hisaji; Moroi, Shiro; and Sakanoue, Akira, 4,590,316, Cl. 570-150.000.

Morris, Peter C.: *See*—
Lim, Draholsav; and Morris, Peter C., 4,590,301, Cl. 568-633.000.

Morris, Royston L., to Lucas Industries. Suspension struts for vehicles. 4,589,529, Cl. 188-322.170.

Morrison, Charles E.: *See*—
Pfuhl, Paul H.; Morrison, Charles E.; and Decker, Victor D., 4,589,713, Cl. 339-7.000.

Morrison, Francis V., Jr. Ascent gauge for divers. 4,589,283, Cl. 73-432.00R.

MORS: *See*—
Payraudeau, Henri-Andre , 4,589,538, Cl. 194-205.000.

Morton Thiokol, Inc.: *See*—
Hill, Robert W., 4,590,041, Cl. 422-165.000.
Streeter, Bruce E.; MacMillan, John H.; and Bertozzi, Eugene R., 4,590,240, Cl. 525-123.000.

Mos, Arie L.; and Bukkems, Franciscus H. J., to Shell Oil Company. Multistage reactor for exothermic or endothermic chemical processes. 4,590,044, Cl. 422-191.000.

Moscowitz, Charles M.: *See*—
Sidoti, Daniel R.; Dokos, John H.; Katz, Edward; and Moscowitz, Charles M., 4,590,085, Cl. 426-582.000.

Moseman, Roger E. Liquid foot treatment composition. 4,589,994, Cl. 252-107.000.

Mossle, Walter: *See*—
Loge, Hans; Eibofner, Eugen; and Mossle, Walter, 4,589,847, Cl. 433-126.000.

Motoren-Werke Mannheim Aktiengesellschaft vorm, Benz Abt, stationarer Motorenbau: *See*—
Stankewitsch, Leo, 4,589,397, Cl. 123-590.000.

Motorola, Inc.: *See*—
Burke, Timothy M.; Noble, Scott W.; Freeburg, Thomas A.; and Krebs, Jay R., 4,590,473, Cl. 340-825.520.
Cave, David L.; and Bynum, Byron G., 4,590,389, Cl. 307-303.000.
Du Bois, Jerry M.; and Spanjer, Keith G., 4,589,195, Cl. 29-588.000.
Heath, Michael C.; and Nelson, Leonard E., 4,590,618, Cl. 455-343.000.
Karim, Frank; Frank, Howard L.; and Hopman, Nicholas C., 4,589,401, Cl. 123-479.000.
Kissinger, Carlos A.; and Goode, Raun L., 4,589,201, Cl. 29-764.000.
Pace, Gary L., 4,590,394, Cl. 307-549.000.
Stewart, Timothy C.; Ofman, Leo; Blair, Kelvin R.; and Gregg, Randolph M., 4,589,547, Cl. 206-328.000.

Motsiff, William T.: *See*—
Linde, Harold G.; MacIntyre, Michael W.; and Motsiff, William T., 4,590,258, Cl. 528-189.000.

Moulinie, Raoul M.; and Gagne, Guy, to Z-Tech Enterprises Inc. Joining element. 4,589,242, Cl. 52-396.000.

Mueller, Karl F.: *See*—
Kaschig, Jurgen; Kleiner, Eduard K.; Mueller, Karl F.; and Cooke, Thomas W., 4,590,129, Cl. 428-425.100.

Mueller, Martin: *See*—
Ralph, Brian; and Mueller, Martin, 4,589,314, Cl. 83-144.000.

Mukasa, Kikuei: *See*—
Arai, Yoshio; and Mukasa, Kikuei, 4,589,665, Cl. 277-1.000.

Mullen, William A.: *See*—
Holabeck, Gus D.; Mullen, William A.; Smith, Charles M.; and Hawthorne, V. Terrey, 4,589,348, Cl. 105-228.000.

Muller, Hans, to Grapha-Holding AG. Apparatus for temporary storage of a stream of partially overlapping sheets. 4,589,603, Cl. 242-59.000.

Muller, Karl-Hans; and Diehl, Manfred, to Degussa Aktiengesellschaft. Laundry softener concentrate. 4,589,989, Cl. 252-8.750.

Muller, Kurt; Kalt, Paul; Steiner, Pirmin; and Hurlemann, Ernst, to Werkzeugmaschinenfabrik Oerlikon-Buhrle AG. Cartridge conveyor, especially for conveying cartridges from a drum-type magazine to a firing weapon. 4,589,325, Cl. 89-33.020.

Muller, Lutz: *See*—
Heiker, Fred R.; Muller, Lutz; Puls, Walter; and Bischoff, Hilmar, 4,590,179, Cl. 514-25.000.

Muller-Spath, Hans-Jorg: *See*—
Baumer, Albrecht; Schneider, Werner; Muller-Spath, Hans-Jorg; and Brucher, Eberhard, 4,589,636, Cl. 266-271.000.

Muller, Wolfgang; and Knuttel, Bertold, to Bruker Analytische Messtechnik GmbH. Electromagnet for NMR tomography. 4,590,428, Cl. 324-320.000.

Mullins, Lance A.: *See*—
Barari, Hari B.; and Mullins, Lance A., 4,589,981, Cl. 209-474.000.

Mullins, Michael J.; and Hamlin, Percy J., to Dow Chemical Company, The. Preparation of allylic compounds. 4,590,300, Cl. 568-616.000.

Murai, Naoyuki: *See*—
Kohzai, Tetsuo; Murai, Naoyuki; and Yamasaki, Masayoshi, 4,589,518, Cl. 182-2.000.

Murakami, Yasushi: *See*—
Sugiyama, Hiroshi; Hosoda, Keizo; Okada, Masanori; Iwane, Yoshitaka; and Murakami, Yasushi, 4,590,198, Cl. 514-336.000.

Muralidhara, Ranya: *See*—
Pittet, Alan O.; Muralidhara, Ranya; Vock, Manfred H.; Miller, Kevin P.; Luccarelli, Domenick, Jr.; and Wiener, Charles, 4,590,082, Cl. 426-535.000.

Murata, Hiroshi: *See*—
Sasaki, Yutaka; Nakamura, Toshio; Utsumi, Hiroshi; Murata, Hiroshi; and Nakamura, Yoshimi, 4,590,173, Cl. 502-204.000.

Murata Manufacturing Co., Ltd.: *See*—
Sakamoto, Yukio, 4,590,537, Cl. 361-306.000.

Murata, Masanori, to Mitsubishi Denki Kabushiki Kaisha. Overvoltage protective relay device. 4,590,533, Cl. 361-91.000.

Murcko, Nelson F.: *See*—
Citrin, Paul S.; and Murcko, Nelson F., 4,589,870, Cl. 604-210.000.

Murphy, David J.; and Phillips, Leslie N. Method of producing a thermoplastics material. 4,590,027, Cl. 264-135.000.

Murphy, Willard J. Barbeque grill. 4,589,333, Cl. 99-419.000.

Murrah, Howard E., to Ex-Cell-O Corporation. Apparatus for folding and tucking a container closure. 4,589,862, Cl. 493-183.000.

Mussler, Rudiger: *See*—
Schnelle, Eberhard; Jung, Hans-Ulrich; Mussler, Rudiger; and Pfeuffer, Reinhard, 4,589,642, Cl. 269-325.000.

Myers, Gerry A.: *See*—
Martens, Alan; and Myers, Gerry A., 4,589,255, Cl. 60-646.000.

Myojo Foods Co., Ltd.: *See*—
Hatsugai, Satoshi; Kawabata, Yoshiaki; Fujiwara, Akira; Kojima, Hisashi; Harada, Haruo; Kudo, Kesayoshi; and Ohara, Shinya, 4,590,083, Cl. 426-557.000.

Nabisco Brands: *See*—
Karwowski, Jan, 4,590,088, Cl. 426-621.000.

Nack, Herman: *See*—
Allen, Billy R.; Huffman, William J.; and Nack, Herman, 4,589,927, Cl. 134-25.100.

Nagamatsu, Toshio, to Kabushiki Kaisha Yaskawa Denki Seisakusho. Brush holder. 4,590,398, Cl. 310-239.000.

Nagao, Masaji, to Hitachi, Ltd. Absorption type air conditioning system. 4,589,262, Cl. 62-141.000.

Nagao, Taku: *See*—
Takeda, Mikio; Oh-ishi, Tokuro; Nakajima, Hiromichi; and Nagao, Taku, 4,590,188, Cl. 514-211.000.

Nagasawa, Ken: *See*—
Yudate, Kozo; Ohsugi, Yukihiro; Kamishita, Mamoru; and Nagasawa, Ken, 4,589,975, Cl. 208-44.000.

Nagashima, Yoshimitu: *See*—
Ozawa, Hideaki; Hoshino, Seiji; and Nagashima, Yoshimitu, 4,589,646, Cl. 271-4.000.

Nagato, Yoshio, to Kyocera Corporation. Decorative golden sintered alloy. 4,589,917, Cl. 75-238.000.

Nagel, Judy A.: *See*—
Lambert, Robert L.; Nagel, Judy A.; and Bergamo, Robert L., 4,590,138, Cl. 430-25.000.

Naito, Hideki: *See*—
Sato, Kozo; and Naito, Hideki, 4,590,152, Cl. 430-543.000.

Naka, Shigeharu: *See*—
Hirano, Shin-ichi; and Naka, Shigeharu, 4,590,034, Cl. 419-13.000.

Nakagome, Hideki; and Yasuda, Satoshi, to Tokyo Shibaura Denki Kabushiki Kaisha. Magnetic refrigerator. 4,589,953, Cl. 156-645.000.

Nakahara, Toshiaki: *See*—
Yamazaki, Masuo; Matsumoto, Toru; Wakamiya, Katsutoshi; Ohsaki, Ichiro; Nakahara, Toshiaki; and Ushiyama, Hisayuki, 4,590,142, Cl. 430-138.000.

Nakajima, Fumio: *See*—
Nikaido, Akira; Machida, Takayasu; Hirosawa, Yasuhisa; and Nakajima, Fumio, 4,590,529, Cl. 360-106.000.
Nakajima, Hiromichi: *See*—
Takeda, Mikio; Oh-ishi, Tokuro; Nakajima, Hiromichi; and Nagao, Taku, 4,590,188, Cl. 514-211.000.
Nakamatsu, Syuji; and Shimamune, Takayuki, to Permelec Electrode Ltd. Process for electrolytic treatment of metal by liquid power feeding. 4,589,959, Cl. 204-28.000.
Nakamura, Kazuharu; and Takeuchi, Kazuhiko, to Toyotomi Kogyo Co., Ltd. Device for adjusting the vertical position of wick in oil burner. 4,589,842, Cl. 431-301.000.
Nakamura, Masato: *See*—
Takemoto, Sohei; and Nakamura, Masato, 4,590,522, Cl. 358-321.000.
Nakamura, Morio; Obayashi, Shigeji; Takemori, Shinichi; Tanaka, Hitoshi; and Hirakawa, Motomu, to Seitetsu Kagaku Co., Ltd. Water-swellable elastomer composition. 4,590,227, Cl. 523-130.000.
Nakamura, Toshio: *See*—
Sasaki, Yutaka; Nakamura, Toshio; Utsumi, Hiroshi; Murata, Hiroshi; and Nakamura, Yoshimi, 4,590,173, Cl. 502-204.000.
Nakamura, Yoshimi: *See*—
Sasaki, Yutaka; Nakamura, Toshio; Utsumi, Hiroshi; Murata, Hiroshi; and Nakamura, Yoshimi, 4,590,173, Cl. 502-204.000.
Sasaki, Yutaka; Utsumi, Hiroshi; Mori, Kunio; Yamamoto, Hiroshi; Nakamura, Yoshimi; Moriya, Kiyoshi; Morii, Akimitsu; Noda, Mikio; and Kunitani, Miki, 4,590,175, Cl. 502-249.000.
Nakane, Hisashi; Yokota, Akira; Yabuta, Mitsuo; Tsuda, Minoru; and Ishii, Wataru, to Tokyo Ohka Kogyo Co., Ltd. Method for fine pattern formation on a photoresist. 4,590,149, Cl. 430-325.000.
Nakanishi, Tami: *See*—
Ohashi, Ryutaro; Hasegawa, Hisashi; Miyoshi, Masao; Iida, Hajime; Mase, Toshiyuki; Tanaka, Takashi; Funatsu, Tsunemasa; and Nakanishi, Tami, 4,589,261, Cl. 62-73.000.
Nakano, Hisaji: *See*—
Kita, Yasushi; Nakano, Hisaji; Moroi, Shiro; and Sakanoue, Akira, 4,590,316, Cl. 570-150.000.
Nakano, Kazuhiko: *See*—
Hashimoto, Tadanori; Nakano, Kazuhiko; Hama, Masaaki; and Matsuda, Norio, 4,590,053, Cl. 423-344.000.
Hashimoto, Tadanori; Nakano, Kazuhiko; and Matsuda, Norio, 4,590,127, Cl. 428-405.000.
Nakao, Yukihiro: *See*—
Nishimori, Katsuhiko; and Nakao, Yukihiro, 4,590,079, Cl. 426-265.000.
Nakayama, Yasuhiko; Takami, Fumio; and Shigeno, Masashi, to Chinon Kabushiki Kaisha. Electronic flash incorporated camera. 4,589,747, Cl. 354-149.110.
Nalco Chemical Company: *See*—
Ferguson, Sam; and Reese, Darrell D., 4,589,979, Cl. 208-263.000.
Namba Press Works Co. Ltd.: *See*—
Goto, Fumio, 4,590,026, Cl. 264-221.000.
Naohara, Junsuke; Horie, Toshiki; and Kino, Toru, to Japan Styrene Paper Corp. Apparatus for the preparation of a foamed article of a polyolefin resin. 4,589,845, Cl. 432-239.000.
Nasby, Charles L., Jr. Dock structure and method and apparatus for raising and lowering same. 4,589,800, Cl. 405-221.000.
Nath, Prem; Barnard, Timothy J.; and Crea, Dominic, to Energy Conversion Devices, Inc. Photovoltaic device and method. 4,590,327, Cl. 136-256.000.
National Distillers and Chemical Corporation: *See*—
Zehler, Eugene R.; and Beimesch, Bruce J., 4,589,990, Cl. 252-56.00S.
National Medical Distributors: *See*—
Koledin, Michael J.; and Garth, Geoffrey C., 4,589,407, Cl. 128-87.00R.
National Research Development Corporation: *See*—
James, James R.; and Johnson, Reginald H., 4,589,422, Cl. 128-804.000.
National Research Institute for Metals: *See*—
Nishida, Isao; and Masumoto, Katashi, 4,589,918, Cl. 75-244.000.
National Semiconductor Corporation: *See*—
Sajja, Vijay M.; and Mathew, Ranjan, 4,589,962, Cl. 204-15.000.
Wilcox, Milton E., 4,590,444, Cl. 331-111.000.
National Starch and Chemical Corporation: *See*—
Miller, Birgit J.; Bell, Harvey; and Wojcak, Eugene, 4,590,084, Cl. 426-557.000.
Nautilus Sports/Medical Industries, Inc.: *See*—
Baldwin, Dan D., 4,589,656, Cl. 272-73.000.
Navigation Sciences Inc.: *See*—
Rogoff, Mortimer; Winkler, Peter M.; and Ackley, John N., 4,590,569, Cl. 364-452.000.
NDM Corporation: *See*—
Cartmell, James V., 4,590,089, Cl. 427-2.000.
NEC Corporation: *See*—
Fukui, Izumu; Hamatsuki, Takeshige; Yano, Takeshi; Sato, Eiichi; and Inui, Osamu, 4,589,786, Cl. 400-124.000.
Tanaami, Shigeyuki; and Yamamoto, Osamu, 4,590,417, Cl. 323-229.000.
Nederlandse Centrale Organisatie Voor Toegepast-Natuurivetenschap-: *See*—
van Gasselt, Max L. G.; and Rappoldt, Louis M., 4,589,352, Cl. 110-216.000.
Needham, Barbara; and Ross, Peter W., to International Standard Electric Corporation. Polychromatic liquid crystal display with reflective electrode pads. 4,589,734, Cl. 350-336.000.
Neefe, Charles W. Method of improving spin cast lenses. 4,590,018, Cl. 264-2.100.
Negishi, Fumio: *See*—
Ota, Akiho; and Negishi, Fumio, 4,590,021, Cl. 264-25.000.
Neitzell, Jerry L.: *See*—
Relihan, Gary F.; Grass, Joseph J.; and Neitzell, Jerry L., 4,590,603, Cl. 378-108.000.
Nelson, Leonard E.: *See*—
Heath, Michael C.; and Nelson, Leonard E., 4,590,618, Cl. 455-343.000.
Nelson, William; and Bearpark, John P., to BICC Public Limited Company. Electrolytic refining of metal. 4,589,469, Cl. 164-460.000.
Neueder, Ludwig. Apparatus for testing plastic profiles by a magnetically suspended probe. 4,590,420, Cl. 324-54.000.
Neuhaus, Klaus, to Eduard Wille GmbH & Co. Device for tightening a screw fastening, especially for tightening it beyond the yield point by controlling the angle of rotation. 4,589,289, Cl. 73-862.230.
Neumann, Harald P. G., to Tryckluftteknik Harald Neumann AB. Chuck and rotary tool to be used when making a hole in a workpiece. 4,589,310, Cl. 82-1.400.
Neumann, Peter: *See*—
Zeiner, Hartmut; Fischer, Jurgen; Heinz, Gerhard; Neumann, Peter; Nissen, Dietmar; and Schaefer, Gerhard, 4,590,104, Cl. 427-389.900.
Nevyas, Herbert J. Intraocular lens. 4,589,147, Cl. 623-6.000.
New England Microwave Corporation: *See*—
Wagner, Walter D., 4,590,434, Cl. 330-102.000.
New Product Development, Inc.: *See*—
Pomarolli, Thomas, 4,589,572, Cl. 222-83.500.
Newling, Robert P., to Plastigage Corporation. Glass fiber sucker rod system. 4,589,796, Cl. 403-266.000.
NEYRPIC: *See*—
Rondot, Jack; and Casacci, Severin, 4,589,821, Cl. 415-111.000.
Nicholson, John E.; and Gilbert, William A., to RCA Corporation. Circuit board mounting arrangement. 4,590,540, Cl. 361-400.000.
Nielson, Richard: *See*—
Hall, Holland; and Nielson, Richard, 4,589,722, Cl. 339-272.0UC.
Niggemann, Johannes: *See*—
Brunn, Horst; Niggemann, Johannes; Kohler, Peter; and Hund, Franz, 4,589,906, Cl. 71-80.000.
Nigrin, Jaroslava M., to Corning Glass Works. Low temperature lead and cadmium-free frits. 4,590,171, Cl. 501-25.000.
Nihon Plast Co., Ltd.: *See*—
Koike, Yasuhisa; Kaneko, Kazuhiro; Inaba, Kazuo; and Yamamoto, Naoki, 4,590,340, Cl. 200-61.540.
Nihon Tokushu Noyaku Seizo K.K.: *See*—
Shiokawa, Kozo; Kagabu, Shinzo; and Tsuboi, Shinichi, 4,590,272, Cl. 544-335.000.
Niikawa, Ryo: *See*—
Ohtaki, Keizaburo; Niikawa, Ryo; and Kondou, Masahide, 4,589,199, Cl. 29-714.000.
Niisei Kagaku Ltd.: *See*—
Sato, Zenjiro; and Kazama, Kazuyosi, 4,589,903, Cl. 71-9.000.
Nikaido, Akira; Machida, Takayasu; Hirosawa, Yasuhisa; and Nakajima, Fumio, to Citizen Watch Co., Ltd. Carriage device for moving and positioning magnetic head. 4,590,529, Cl. 360-106.000.
Nikolayuk, Nicholas; and Sikina, Thomas V., Jr., to RCA Corporation. Broadcast antenna which radiates horizontal polarization towards distant locations and circular polarization towards nearby locations. 4,590,480, Cl. 343-771.000.
Nilsson, Erik W.; Brunnegard, Ake; and Ring, Hans. Mounting arrangement. 4,589,793, Cl. 403-13.000.
Nimon, Susan K.: *See*—
Kochte, Werner W.; and Nimon, Susan K., 4,589,161, Cl. 15-372.000.
Nintendo Co., Ltd.: *See*—
Yokoi, Gunpei; and Shirai, Ichiro, 4,589,659, Cl. 273-1.0GC.
Nio, Satoru; Hamashima, Toyoji; and Sato, Shinobu, to Yaskawa Electric Mfg. Co., Ltd. Welding robot controlling method. 4,590,577, Cl. 364-513.000.
Nippe, Reynold B. Method and system for insulating pipes. 4,590,108, Cl. 428-36.000.
Nippon Electric Co., Ltd.: *See*—
Hirakawa, Noboru; and Tsujide, Tohru, 4,590,508, Cl. 357-41.000.
Nippon Kogaku K. K.: *See*—
Saegusa, Takashi, 4,589,756, Cl. 354-432.000.
Nippon Kokan Kabushiki Kaisha: *See*—
Nomura, Hirokazu; Sugitani, Yuji; and Tamaoki, Naohiro, 4,590,355, Cl. 219-125.120.
Nippon Oil and Fats Co., Ltd.: *See*—
Moriya, Yasuo; and Kagei, Kazunori, 4,590,248, Cl. 526-228.000.
Nippon Petrochemicals Company: *See*—
Yamazaki, Yasuo; and Suzuki, Takehiko, 4,590,281, Cl. 548-545.000.
Nippon Seiko Kabushiki Kaisha: *See*—
Okoshi, Hideo, 4,589,857, Cl. 464-145.000.
Tamaki, Akira, 4,590,380, Cl. 250-442.100.
Nippon Sheet Glass Co., Ltd.: *See*—
Yoshizawa, Hideo; Nushi, Masaaki; Sakurai, Kaoru; Usui, Hirotaro; Iida, Naohiro; Tanaka, Togo; and Honjo, Seiichiro, 4,589,901, Cl. 65-107.000.
Nippon Telegraph & Telephone Corporation: *See*—
Saito, Shigeki; and Urabe, Shuuji, 4,590,442, Cl. 331-107.00A.
Nippon Telegraph & Telephone Public Corporation: *See*—
Ido, Satoshi; Fujinami, Minpei; Kato, Yasuo; Sakitani, Yoshio; and Ozasa, Susumu, 4,589,773, Cl. 356-371.000.

Nippondenso Co., Ltd.: *See*—
Matsumura, Toshimi; Omori, Norio; and Kobayashi, Hisanori, 4,590,563, Cl. 364-431.050.
Mayumi, Nobuo; Kato, Hidetoshi; and Matsuhashi, Hajime, 4,590,414, Cl. 320-64.000.
Takasu, Yasuhito; Iwata, Toshiharu; Haraguchi, Hiroshi; and Hosoe, Katsuharu, 4,590,565, Cl. 364-431.080.
Watanabe, Takashi; and Sasage, Yoshihiro, 4,589,771, Cl. 356-38.000.

Nishida, Isao; and Masumoto, Katashi, to National Research Institute for Metals. Thermal shock resistant thermoelectric material. 4,589,918, Cl. 75-244.000.

Nishida, Masami: *See*—
Okamoto, Hiroo; Kobayashi, Masaharu; Hoshino, Takashi; and Nishida, Masami, 4,590,524, Cl. 360-65.000.

Nishihashi, Hideji; Matsubayashi, Tadao; Katabami, Tadashi; and Matsuda, Ken-ichi, to Dainippon Ink and Chemicals, Inc.; and Dic Fine Chemicals, Inc. Process for production of β-glycosyl stevioside derivatives. 4,590,160, Cl. 435-78.000.

Nishijima, Hideo: *See*—
Fukushima, Isao; Kobori, Yasunori; and Nishijima, Hideo, 4,590,438, Cl. 330-300.000.

Nishikawa, Masao; Sakurai, Yoshimi; Aoki, Takashi; and Sato, Yoichi, to Honda Giken Kogyo Kabushiki Kaisha. Lock-up control device for torque converter in automatic transmission for vehicle. 4,589,537, Cl. 192-0.052.

Nishimori, Katsuhiko; and Nakao, Yukihiro, to Takeda Chemical Industries, Ltd. Method and composition for preventing discoloration of meat products. 4,590,079, Cl. 426-265.000.

Nissan Chemical Industries, Ltd.: *See*—
Watanabe, Yoshitane; Suzuki, Keitaro; and Teranishi, Masayuki, 4,589,997, Cl. 252-313.100.

Nissan Motor Co., Ltd.: *See*—
Abo, Keiju; Kumura, Haruyoshi; Hirano, Hiroyuki; Tanaka, Yoshikazu; Yamamuro, Sigeaki; and Morimoto, Yoshiro, 4,590,561, Cl. 364-424.100.
Kubota, Toru, 4,590,409, Cl. 318-139.000.
Omura, Hideo, 4,589,515, Cl. 181-227.000.

Nissen, Dietmar; Marx, Matthias; and Schmidt, Hans U., to BASF Aktiengesellschaft. Process for the preparation of elastomeric molded parts having urethane or urethane and urea groups with improved light fastness and weather resistance. 4,590,219, Cl. 521-51.000.

Nissen, Dietmar: *See*—
Horn, Peter; Bunsch, Hellmut; Hesse, Anton; Marx, Matthias; Nissen, Dietmar; and Heckmann, Walter, 4,590,242, Cl. 525-183.000.
Zeiner, Hartmut; Fischer, Jurgen; Heinz, Gerhard; Neumann, Peter; Nissen, Dietmar; and Schaefer, Gerhard, 4,590,104, Cl. 427-389.900.

Nitto Chemical Industry Co., Ltd.: *See*—
Sasaki, Yutaka; Nakamura, Toshio; Utsumi, Hiroshi; Murata, Hiroshi; and Nakamura, Yoshimi, 4,590,173, Cl. 502-204.000.
Sasaki, Yutaka; Utsumi, Hiroshi; Mori, Kunio; Yamamoto, Hiroshi; Nakamura, Yoshimi; Moriya, Kiyoshi; Morii, Akimitsu; Noda, Mikio; and Kunitani, Miki, 4,590,175, Cl. 502-249.000.

Nitto Electric Industrial Co., Ltd.: *See*—
Kazuse, Yoshitaka; Iwama, Akio; and Chikura, Shinichi, 4,590,098, Cl. 427-244.000.
Saito, Kenichiro; Heller, Jorge; and Skinner, Wilfred A., 4,590,190, Cl. 514-221.000.

Niziol, Chester. Knock-down furniture construction, corner bracket and method. 4,589,792, Cl. 403-11.000.

NL Industries, Inc.: *See*—
Rodney, Paul F., 4,590,593, Cl. 367-83.000.

Noble, Scott W.: *See*—
Burke, Timothy M.; Noble, Scott W.; Freeburg, Thomas A.; and Krebs, Jay R., 4,590,473, Cl. 340-825.520.

Noda, Makoto, to Tokyo Shibaura Denki Kabushiki Kaisha. Microcomputer with power-save output instructions. 4,590,553, Cl. 364-200.000.

Noda, Mikio: *See*—
Sasaki, Yutaka; Utsumi, Hiroshi; Mori, Kunio; Yamamoto, Hiroshi; Nakamura, Yoshimi; Moriya, Kiyoshi; Morii, Akimitsu; Noda, Mikio; and Kunitani, Miki, 4,590,175, Cl. 502-249.000.

Noda, Sadafumi: *See*—
Zimmern, Bernard; and Noda, Sadafumi, 4,589,826, Cl. 417-368.000.

Noe, Christian: *See*—
Binder, Dieter; and Noe, Christian, 4,590,203, Cl. 514-397.000.

Nogiwa, Kengo: *See*—
Iwasa, Seiichi; Nogiwa, Kengo; and Kaneko, Yoshiya, 4,590,587, Cl. 365-1.000.

Noguchi, Akio; Moriguchi, Haruhiko; Inui, Toshiharu; and Hisatake, Masayuki, to Fuji Xerox Co., Ltd. Thermal recording apparatus. 4,590,487, Cl. 346-76.0PH.

Nokovich, Nick, to Westinghouse Electric Corp. Precision internal tube cutter. 4,589,309, Cl. 82-1.200.

Nomura, Hirokazu; Sugitani, Yuji; and Tamaoki, Naohiro, to Nippon Kokan Kabushiki Kaisha. Method of controlling multi-layer welding. 4,590,355, Cl. 219-125.120.

Nomura, Keiichi: *See*—
Tomiuga, Takashi; Nomura, Keiichi; and Tajima, Tetsuya, 4,590,207, Cl. 514-470.000.

Nomura, Minoru: *See*—
Shibata, Tomoo; Jurdi, Wissam J.; and Nomura, Minoru, 4,590,497, Cl. 346-201.000.

Nonomura, Yutaka: *See*—
Sugiyama, Jun; Nonomura, Yutaka; Tsukada, Kouji; Shimaoka, Keiichi; Takeuchi, Masaharu; and Takeuchi, Takashi, 4,589,290, Cl. 73-862.360.

Norchem, Inc.: *See*—
Dombro, Robert A.; and Kirch, William, 4,590,246, Cl. 526-106.000.

Norris, Philip R.; and Cocco, Vincent L., to Polaroid Corporation. Film processor with S-curve fluid applicator pad. 4,589,752, Cl. 354-303.000.

North American Philips Consumer Electronic Corp.: *See*—
Lambert, Robert L.; Nagel, Judy A.; and Bergamo, Robert L., 4,590,138, Cl. 430-25.000.

North, John M., to United Kingdom Atomic Energy Authority. Composite cathode for electrochemical cell. 4,589,197, Cl. 29-623.100.

Northern Engineering and Plastics Corp.: *See*—
Crisci, Clem C., 4,589,561, Cl. 215-256.000.

Northern Telecom Limited: *See*—
Aujla, Sharanjit S.; Middlehurst, Richard J.; and Simpson, John P., 4,589,720, Cl. 339-147.00R.

Norton, Robert O.: *See*—
DiCarlo, Leonard J.; Ares, Roland A.; and Norton, Robert O., 4,589,263, Cl. 62-193.000.

Nowacki, Christopher; and Brisson, Alfred, to Trutek Research, Inc. Anesthesiology connector. 4,589,684, Cl. 285-319.000.

Noweck, Klaus: *See*—
Albert, Gert; Kamps, Manfred; Noweck, Klaus; Reichenauer, Ansgar; Scherf, Erich; and Ziegler, Udo, 4,590,289, Cl. 556-188.000.

Nozawa, Kazuo, to Diesel Kiki Company, Ltd. Heat exchanger for an air conditioning system evaporator. 4,589,265, Cl. 62-526.000.

Nukala, August R.; Perez, Arthur; and Brumfield, Timothy L., to RPR Filtration Systems, Inc. Fluid recovery system. 4,589,955, Cl. 196-114.000.

Nunemaker, Joseph P.; and Hicks, Samuel, to Security Systems Internationale, Inc. Hostage negotiation telephone system. 4,590,331, Cl. 179-5.00R.

Nushi, Masaaki: *See*—
Yoshizawa, Hideo; Nushi, Masaaki; Sakurai, Kaoru; Usui, Hirotaro; Iida, Naohiro; Tanaka, Togo; and Honjo, Seiichiro, 4,589,901, Cl. 65-107.000.

Nussrallah, Steve: *See*—
Guttag, Karl M.; and Nussrallah, Steve, 4,590,552, Cl. 364-200.000.

O.E.T. Metalconsult s.r.l.: *See*—
Gorgerino, Mario D., 4,589,915, Cl. 75-53.000.

O.M.V.L. s.r.l.: *See*—
Regazzi, Renzo, 4,589,443, Cl. 137-588.000.

Oakley, C. Mitchell, Jr.; and Chatman, William L., to Stancil Textile Co., Inc. Circular terry knitting machine and method. 4,589,266, Cl. 66-12.000.

Obara, Haruki; Izumiya, Shunzo; Okuyama, Yuji; and Sakurai, Akihiro, to Fanuc Ltd. Electric discharge machining power source. 4,590,353, Cl. 219-69.00C.

Obayashi, Shigeji: *See*—
Nakamura, Morio; Obayashi, Shigeji; Takemori, Shinichi; Tanaka, Hitoshi; and Hirakawa, Motomu, 4,590,227, Cl. 523-130.000.

Oberdorfer, Guido. Piston machine having at least two pistons. 4,589,329, Cl. 92-72.000.

Oberjatzas, Gunter: *See*—
Platte, Hans-Joachim; Voessing, Walter; Oberjatzas, Gunter; and Schroder, Ernst, 4,590,531, Cl. 360-47.000.

O'Brien Corporation, The: *See*—
Vass, Richard T., 4,590,218, Cl. 521-50.000.

Obu, Makoto, to Ricoh Company, Ltd. Light transmission control apparatus using air bubbles. 4,589,730, Cl. 350-267.000.

Occidental Chemical Corporation: *See*—
Maul, James J.; and Tang, David Y., 4,590,315, Cl. 570-127.000.
Warszawski, Bernard; Fauvel, Pierre; and Arlie, Jean, 4,590,134, Cl. 429-35.000.
Warszawski, Bernard; Fauvel, Pierre; and Dupre, Sylvain, 4,590,135, Cl. 429-38.000.

O'Connor, Charles A., to Lesnor Maehr Manufacturing Corp. Power draw bar. 4,589,808, Cl. 409-233.000.

O'Connor, Donald F.; and Zansky, Zoltan, to Honeywell Inc. FET-bipolar drive circuit. 4,590,395, Cl. 307-570.000.

O'Connor, James M.; and Frentzel, Richard L., to Olin Corporation. Preparation of ionomers and polyurethane elastomers from carboxylic acid-containing mcnoether and polyether polyol addition products. 4,590,255, Cl. 528-71.000.

Oda, Haruo: *See*—
Asano, Kajio; Sato, Toshihiko; Oda, Haruo; Abe, Yasuaki; and Watanabe, Yoshitaka, 4,589,184, Cl. 29-430.000.

Oda, Hiroyuki; Yokooku, Katsuhiko; Seo, Nobuhide; and Shiraishi, Hideo, to Mazda Motor Corporation. Control system for an automotive driving system including an engine throttle valve and a stepless transmission. 4,589,302, Cl. 74-866.000.

Offermann, Peter: *See*—
Marx, Karl; Offermann, Peter; Reumann, Ralf-Dieter; Magel, Matthias; Frenzel, Bertram; and Grenzendorfer, Dietmar, 4,589,169, Cl. 19-304.000.

Office National d'Etudes et de Recherche Aerospatiales (ONERA): *See*—
Durremberger, Pierre, 4,589,740, Cl. 350-487.000.

Ofman, Leo: *See*—
Stewart, Timothy C.; Ofman, Leo; Blair, Kelvin R.; and Gregg, Randolph M., 4,589,547, Cl. 206-328.000.

Ogawa, Hitoshi, to Mitsubishi Denki Kabushiki Kaisha. Vane pump. 4,589,829, Cl. 418-259.000.
Ogawa, Hitoshi: *See*—
Kume, Satoru; Yoshida, Michiyasu; Konno, Yoshihiro; Kume, Tateo; Takada, Hiroaki; Shinsei, Kiyoichi; Matsumoto, Akio; and Ogawa, Hitoshi, 4,589,254, Cl. 60-286.000.
O'Grady, Hedwig: *See*—
Deckner, George E.; O'Grady, Hedwig; and Zofchak, Albert, 4,590,069, Cl. 424-70.000.
Oh-ishi, Tokuro: *See*—
Takeda, Mikio; Oh-ishi, Tokuro; Nakajima, Hiromichi; and Nagao, Taku, 4,590,188, Cl. 514-211.000.
Ohara, Shinya: *See*—
Hatsugai, Satoshi; Kawabata, Yoshiaki; Fujiwara, Akira; Kojima, Hisashi; Harada, Haruo; Kudo, Kesayoshi; and Ohara, Shinya, 4,590,083, Cl. 426-557.000.
Ohara, Terumi: *See*—
Takanashi, Itsuo; Tanaka, Hideshi; Ohara, Terumi; Kato, Shigeru; Takahashi, Toshinori; Kiuchi, Tsutomu; and Kitamura, Hiroki, 4,590,490, Cl. 346-76.0PH.
O'Harra, Dale G., II, to Britt Corporation. Pulsed laser system. 4,590,598, Cl. 372-38.000.
Ohashi, Ryutaro; Hasegawa, Hisashi; Miyoshi, Masao; Iida, Hajime; Mase, Toshiyuki; Tanaka, Takashi; Funatsu, Tsunemasa; and Nakanishi, Tami, to Daikin Industries, Ltd. Ice making machine and method of manufacture thereof. 4,589,261, Cl. 62-73.000.
Ohashi, Takashi: *See*—
Hashimoto, Takatsugu; and Ohashi, Takashi, 4,590,123, Cl. 428-316.600.
Ohio University: *See*—
Chen, Wenjai R.; and Savage, Robert L., 4,590,056, Cl. 423-449.000.
Ohishi, Chikashi: *See*—
Takahashi, Hiroshi; Tamaki, Hiroyuki; Ohishi, Chikashi; and Shiba, Keisuke, 4,590,148, Cl. 430-303.000.
Ohkuni, Shinichiro; and Kitazawa, Yoichi, to Bridgestone Corporation. Pneumatic belted tires. 4,589,461, Cl. 152-209.00R.
Ohmura, Hiroshi, to Fuji Photo Film Co., Ltd. Exposure control device for camera. 4,589,748, Cl. 354-195.120.
Ohno, Youzi; Sato, Yoshiaki; Yamashita, Yoshito; and Mizukami, Etsuo, to Sharp Kabushiki Kaisha. Fluid injection device for transmitting fluid. 4,589,455, Cl. 141-311.00R.
Ohsaki, Ichiro: *See*—
Yamazaki, Masuo; Matsumoto, Toru; Wakamiya, Katsutoshi; Ohsaki, Ichiro; Nakahara, Toshiaki; and Ushiyama, Hisayuki, 4,590,142, Cl. 430-138.000.
Ohsugi, Yukihiro: *See*—
Yudate, Kozo; Ohsugi, Yukihiro; Kamishita, Mamoru; and Nagasawa, Ken, 4,589,975, Cl. 208-44.000.
Ohtaki, Keizaburo; Niikawa, Ryo; and Kondou, Masahide, to Honda Giken Kogyo Kabushiki Kaisha. Apparatus for assembling a door on a vehicle body. 4,589,199, Cl. 29-714.000.
Ohtaki, Kiyoshi; and Ishida, Kohji, to Pioneer Electronic Corporation. Multipath distortion reducing circuit. 4,590,615, Cl. 455-304.000.
Oishi, Kengo; and Suzuki, Osamu, to Fuji Photo Film Co., Ltd. Magnetic tape cassette. 4,589,609, Cl. 242-198.000.
Okada, Hiroshi: *See*—
Haga, Takahiro; Toki, Tadaaki; Koyanagi, Toru; Okada, Hiroshi; Yoshida, Kiyomitsu; and Imai, Osamu, 4,590,182, Cl. 514-80.000.
Okada, Masanori: *See*—
Sugiyama, Hiroshi; Hosoda, Keizo; Okada, Masanori; Iwane, Yoshitaka; and Murakami, Yasushi, 4,590,198, Cl. 514-336.000.
Okada, Toshihiko, to Oki Electric Industry Co., Ltd. Automatic transaction system. 4,590,365, Cl. 235-379.000.
Okado, Kenji: *See*—
Mitsuhashi, Yasuo; Takenouchi, Masanori; Tajima, Hatsuo; Uchiyama, Masaki; Urawa, Motoo; and Okado, Kenji, 4,590,140, Cl. 430-102.000.
Okamoto, Hiroo; Kobayashi, Masaharu; Hoshino, Takashi; and Nishida, Masami, to Hitachi, Ltd. Multitrack PCM reproducing apparatus. 4,590,524, Cl. 360-65.000.
Okamura, Shigeru, to Canon Kabushiki Kaisha. Multi-color ink jet printer. 4,590,495, Cl. 346-140.00R.
Okasaka, Hotsuma: *See*—
Kawakami, Ken-ichi; Yoshii, Toshiya; Suzuki, Masaru; and Okasaka, Hotsuma, 4,590,119, Cl. 428-216.000.
Oki Electric Industry Co., Ltd.: *See*—
Okada, Toshihiko, 4,590,365, Cl. 235-379.000.
Oki, Yasuo: *See*—
Tsuruta, Orihiro; Oki, Yasuo; and Zinbo, Yasugi, 4,589,247, Cl. 53-550.000.
Okitsu, Kingo: *See*—
Tokushima, Takashige; Okitsu, Kingo; Mochizuki, Yoshiyuki; and Tsuji, Kouji, 4,589,396, Cl. 123-559.000.
Okoshi, Hideo, to Nippon Seiko Kabushiki Kaisha. Constant velocity universal joint. 4,589,857, Cl. 464-145.000.
Okudaira, Sadao: *See*—
Tomori, Yasumasa; Okudaira, Sadao; Aoki, Harumi; Urano, Fumio; and Morisawa, Tahei, 4,589,750, Cl. 354-271.100.
Okuyama, Yuji: *See*—
Obara, Haruki; Izumiya, Shunzo; Okuyama, Yuji; and Sakurai, Akihiro, 4,590,353, Cl. 219-69.00C.
Olin Corporation: *See*—
Cawlfield, David W., 4,590,058, Cl. 423-515.000.
Ford, James M., 4,589,966, Cl. 204-228.000.
O'Connor, James M.; and Frentzel, Richard L., 4,590,255, Cl. 528-71.000.
Oliver, Ward H.: *See*—
Blackwell, Joseph T.; Daughety, Harold L.; Grace, Henry C.; and Oliver, Ward H., 4,590,292, Cl. 560-124.000.
Olson, Wayne L.; and Hensley, Billy R., to Rose Manufacturing Company. Fall arrester and emergency retrieval apparatus and anchor apparatus therefor. 4,589,523, Cl. 182-234.000.
Olster, Elliot F.; and Chase, Vance A., to United Technologies Corporation. Pressure vessel opening seal. 4,589,564, Cl. 220-3.000.
Olympus Optical Co., Ltd.: *See*—
Kobayashi, Minoru; Saitou, Sinichi; and Kitajima, Goro, 4,589,607, Cl. 242-180.000.
Maitani, Yoshihisa; Tsunefuji, Katsuhiko; and Yamasaki, Masafumi, 4,589,754, Cl. 354-431.000.
Maitani, Yoshihisa; Tsunefuji, Katsuhiko; and Yamasaki, Masafumi, 4,589,755, Cl. 354-431.000.
Maitani, Yoshihisa; Tsunefuji, Katsuhiko; and Yamasaki, Masafumi, 4,589,757, Cl. 354-458.000.
Yoshida, Yutaka; Hirayama, Shozo; Kusunoki, Hiroyuki; Shishido, Yoshio; Matsuo, Kazumasa; Mizumoto, Morihide; Kato, Masahiko; and Hagino, Tadao, 4,589,414, Cl. 128-305.000.
Omega SA: *See*—
Mokdad, Mohamed; and Xuan, Mai T., 4,590,412, Cl. 318-696.000.
Omori, Norio: *See*—
Matsumura, Toshimi; Omori, Norio; and Kobayashi, Hisanori, 4,590,563, Cl. 364-431.050.
Omura, Hideo, to Nissan Motor Company, Limited. Exhaust tail pipe arrangement. 4,589,515, Cl. 181-227.000.
Oncogen: *See*—
Twardzik, Daniel R.; and Todaro, George J., 4,590,003, Cl. 530-330.000.
O'Neil, Walter K.: *See*—
Gritter, David J.; and O'Neil, Walter K., 4,590,413, Cl. 318-803.000.
Ono, Satoshi: *See*—
Yanagi, Masaaki; Ono, Satoshi; Toda, Takao; Kashiwagi, Kazuo; Endo, Makoto; and Saito, Yoshihiro, 4,589,767, Cl. 355-45.000.
Opitz, Konrad, to Hoechst Aktiengesellschaft. Liquid reactive dyestuff formulations and their use. 4,589,885, Cl. 8-527.000.
Opsahl, Allan W., to Boeing Company, The. Counterbalanced hinge assembly. 4,589,613, Cl. 244-129.500.
Orihiro Co., Ltd.: *See*—
Tsuruta, Orihiro; Oki, Yasuo; and Zinbo, Yasugi, 4,589,247, Cl. 53-550.000.
Orii, Masaru, to Yugengaisha Kyodogiken. Looping apparatus for coiled material. 4,589,605, Cl. 242-55.000.
Orlowsky, Kenneth J.: *See*—
Dalton, John V.; Orlowsky, Kenneth J.; and Sinha, Ashok K., 4,589,928, Cl. 148-1.500.
Ormat Turbines, Ltd.: *See*—
Bronicki, Lucien Y., 4,590,384, Cl. 290-4.00C.
Ortho Diagnostic Systems, Inc.: *See*—
Zolton, Raymond P.; Kaplan, Paul M.; and Padvelskis, John V., 4,590,002, Cl. 530-386.000.
Oscar Weil GmbH & Co. KG: *See*—
Herzog, Heinz, 4,590,113, Cl. 428-92.000.
O'Sullivan, Brendan W.; Leggett, Leo J.; and Melvin, Maxwell V., to ICI Australia Limited; and State of South Australia. Mollusc culture. 4,589,370, Cl. 119-4.000.
Ota, Akiho; and Negishi, Fumio, to Yoshino Kogyosho Co., Ltd. Method for producing polyester containers. 4,590,021, Cl. 264-25.000.
Otis Engineering Corporation: *See*—
Bayh, Russell I., III, 4,589,482, Cl. 166-105.500.
Otsuka Kagaku Kabushiki Kaisha: *See*—
Tasaka, Takeo; Kawaguchi, Akiyoshi; and Tsujikawa, Yozaburo, 4,590,234, Cl. 524-413.000.
Ott, Vern D Rocker arm lifter assembly. 4,589,384, Cl. 123-90.550.
Ottley, Thomas W., to Prutec Limited. Inlet system for a mass spectrometer. 4,590,371, Cl. 250-289.000.
Otto, Jack F.: *See*—
Colacello, Michael A.; Fitzke, Emil V.; and Otto, Jack F., 4,589,902, Cl. 65-252.000.
Ouchi, Teruo; Tamada, Kazukiyo; and Yamaka, Shiyouichi, to Kabushiki Kaisha Medos Kenkyusho. Apparatus for cleaning and sterilizing a guide tube for a forceps-control member operating wire in an endoscope. 4,589,403, Cl. 128-4.000.
Owens-Corning Fiberglas Corporation: *See*—
Kane, John L.; and Machlan, G. Richard, 4,589,447, Cl. 138-98.000.
Owens-Illinois, Inc.: *See*—
Hudecek, Carl J., 4,589,899, Cl. 65-33.000.
Ozaki, Junji: *See*—
Takahashi, Shozo; Yoshimura, Susumu; and Ozaki, Junji, 4,590,541, Cl. 361-433.000.
Ozaki, Yasuto. Apparatus for projecting a laser beam in a linear pattern. 4,589,738, Cl. 350-443.000.
Ozasa, Susumu: *See*—
Ido, Satoshi; Fujinami, Minpei; Kato, Yasuo; Sakitani, Yoshio; and Ozasa, Susumu, 4,589,773, Cl. 356-371.000.
Ozawa, Hideaki; Hoshino, Seiji; and Nagashima, Yoshimitu, to Silver Seiko Ltd. Automatic paper feeding device for a printer. 4,589,646, Cl. 271-4.000.
P. L. G. Research Limited: *See*—
Mercer, Frank B., 4,590,029, Cl. 264-156.000.
Pace, Gary L., to Motorola, Inc. Signal processing circuit with voltage clamped input. 4,590,394, Cl. 307-549.000.

Pacific Western Systems, Inc.: *See—*
Milligan, Vernon C., 4,590,422, Cl. 324-158.00F.
Pacifici, Francisco: *See—*
Giancaterini, Gabriel; and Pacifici, Francisco, 4,590,092, Cl. 427-68.000.
Padovani, Francois A.: *See—*
Shukla, Vishwa; Padovani, Francois A.; and Cooper, Lawrence, 4,590,400, Cl. 310-338.000.
Padvelskis, John V.: *See—*
Zolton, Raymond P.; Kaplan, Paul M.; and Padvelskis, John V., 4,590,002, Cl. 530-386.000.
Paeglis, Arnis U.; and Weaver, Ebon P., to Uniroyal Chemical Company, Inc. Method for waterproofing surfaces. 4,589,804, Cl. 405-270.000.
Paillassa, Gilles: *See—*
Gaset, Antoine; Rigal, Luc; Paillassa, Gilles; Salome , Jean-Paul; and Fleche, Guy, 4,590,283, Cl. 549-488.000.
Pakosh, Peter, to Kendon Manufacturing Ltd. Fold-away bed assembly. 4,589,152, Cl. 5-164.00R.
Palm, Bernhard. Socket wrench extension. 4,589,308, Cl. 81-177.850.
Palthe, Richard W.: *See—*
Jensen, Peter W.; and Palthe, Richard W., 4,590,510, Cl. 358-19.000.
Pampouchidis, Georg; and Deu, Herbert, to Vianova Kunstharz, A.G. Stabilized polyisocyanates partially blocked with hydroxy amines. 4,590,009, Cl. 560-332.000.
Panchem GmbH: *See—*
Gain, Thomas, 4,590,164, Cl. 436-15.000.
Panet, Michel, to Electricite de France (Service National). Device for controlling the flowrate of a fluidmore particularly a radioactive fluid. 4,589,440, Cl. 137-486.000.
Pang, Wing S.: *See—*
Meyer, Richard C.; and Pang, Wing S., 4,589,298, Cl. 74-441.000.
Pann, Keh: *See—*
Bowman, Bonita F.; Pann, Keh; and Redeker, Maynard S., 4,590,592, Cl. 367-68.000.
Paquette, Edward J. Aircraft spark plug gapping tool. 4,589,153, Cl. 7-169.000.
Parallel Computers Systems, Inc.: *See—*
Glazer, Sam D.; Baumbach, James; Borg, Anita; and Wittels, Emanuel, 4,590,554, Cl. 364-200.000.
Parekh, Dhan N.; and Williams, David E., to Carborundum Abrasives Company. Sectional abrasive belt. 4,589,233, Cl. 51-399.000.
Parent, Guy: *See—*
Leroy, Claude; and Parent, Guy, 4,590,591, Cl. 367-6.000.
Paris, Jean-Marc: *See—*
Corbet, Jean-Pierre; Cotrel, Claude; Farge, Daniel; and Paris, Jean-Marc, 4,590,004, Cl. 530-317.000.
Park, Bom K., to Aluminum Company of America. Aluminum 6XXX alloy products of high strength and toughness having stable response to high temperature artificial aging treatments and method for producing. 4,589,932, Cl. 148-12.70A.
Park, Dong-Sil, to General Electric Company. Nickel coating diffusion bonded to metallized ceramic body and coating method. 4,590,095, Cl. 427-96.000.
Park, Jin Y., to Research Corporation. Thermocentrifugometric analysis. 4,589,782, Cl. 374-14.000.
Parker, David L., to Barber, Bob, Jr., a part interest. Push button reversible ratchet wrench. 4,589,307, Cl. 81-62.000.
Parran, John J., Jr.; and Sakkab, Nabil Y., to Procter & Gamble Company, The. Oral compositions. 4,590,066, Cl. 424-52.000.
Parvis, Edward F.: *See—*
Boltrek, Henry; and Parvis, Edward F., 4,589,539, Cl. 198-331.000.
Pascal, Roger: *See—*
Dimier, Jean-Pierre; and Pascal, Roger, 4,589,673, Cl. 280-630.000.
Pascoe, Ralph F., to Ashland Oil, Inc. Process and apparatus for further processing of pressurized exothermic reactions. 4,590,293, Cl. 560-233.000.
Pate, Ronald C.; and Hensley, Raymond E. Combustion initiation system employing hard discharge ignition. 4,589,398, Cl. 123-596.000.
Patel, Ambelal R.: *See—*
Seltzer, Raymond; Patel, Ambelal R.; Stewart, Peter W.; and White, Charlene, 4,590,231, Cl. 524-100.000.
Patten, Raymond A.; and Blodgett, Jerry A., to United States of America, Navy. Pulsed remote gauge. 4,589,772, Cl. 356-353.000.
Patterson, Albert W.: *See—*
Patterson, David G.; and Patterson, Albert W., 4,590,474, Cl. 340-944.000.
Patterson, David G.; and Patterson, Albert W. Street crossing signal device for blind persons. 4,590,474, Cl. 340-944.000.
Pavone, Robert J., to Gerber Scientific Instrument Company, The. Dual-axis, single mirror interferometer measuring system. 4,589,746, Cl. 354-4.000.
Payer, Wolfgang: *See—*
Morguet, Hermann; Hobes, John; Spaleck, Walter; and Payer, Wolfgang, 4,590,247, Cl. 526-124.000.
Payne, Fred E.: *See—*
Hoover, William A.; and Payne, Fred E., 4,589,508, Cl. 180-19.100.
Payraudeau, Henri-Andre , to MORS. Device for locking and releasing objects intended for public use, such as luggage carts. 4,589,538, Cl. 194-205.000.
Pearson, Stephen, to Baxter Travenol Laboratories, Inc. Cannula assembly having closed, pressure-removable piercing tip. 4,589,879, Cl. 604-411.000.
Pegasus Sewing Machine Mfg. Co. Ltd.: *See—*
Yamamoto, Khoichi; and Kasuda, Takashi, 4,589,364, Cl. 112-311.000.
Peifer, Gary S.; and Russell, Charles R., to Caterpillar Tractor Co. Centering device. 4,589,639, Cl. 267-150.000.
Pelc, Norbert J.: *See—*
Glover, Gary H.; and Pelc, Norbert J., 4,590,558, Cl. 364-414.000.
Pemco, Inc.: *See—*
Meives, Otis E.; and Lewandoske, James W., 4,589,812, Cl. 414-46.000.
Pereira, Lawrence W.: *See—*
Cummings, Kenneth D.; Gould, Donald R.; Gray, Forrest C.; and Pereira, Lawrence W., 4,590,585, Cl. 364-900.000.
Peretz, Steven I. Holder assembly for stemmed glassware and like objects. 4,589,556, Cl. 211-41.000.
Perez, Arthur: *See—*
Nukala, August R.; Perez, Arthur; and Brumfield, Timothy L., 4,589,955, Cl. 196-114.000.
Peritain, Ltd.: *See—*
Meisner, Lorraine F., 4,590,067, Cl. 424-54.000.
Perkin-Elmer Corporation, The: *See—*
Scott, Raymond P. W., 4,589,477, Cl. 165-66.000.
Perkins, Thomas P., to Atlantic Richfield Company. Cold fluid enhancement of hydraulic fracture well linkage. 4,589,491, Cl. 166-302.000.
Permelec Electrode Ltd.: *See—*
Nakamatsu, Syuji; and Shimamune, Takayuki, 4,589,959, Cl. 204-28.000.
Permutit Company, The: *See—*
Mayeaux, Donald P., 4,589,971, Cl. 204-430.000.
Perocchi, Lee C.: *See—*
Gigliotti, Francis X., Jr.; Perocchi, Lee C.; and Frischmann, Peter G., 4,589,471, Cl. 164-463.000.
Perrenoud, Blaise: *See—*
Berta, Riccardo; and Perrenoud, Blaise, 4,590,343, Cl. 200-282.000.
Persans, Peter D.: *See—*
Roxlo, Charles B.; and Persans, Peter D., 4,590,399, Cl. 310-334.000.
Personal Products Company: *See—*
Holtman, Dennis C., 4,590,114, Cl. 428-171.000.
Pert, James. Connector. 4,589,640, Cl. 269-2.000.
Perun, William D.; and Booth, Ronald P., Sr., to Xerox Corporation. Sheet feeder control for reproduction machines. 4,589,765, Cl. 355-3.0SH.
Perzborn, Elisabeth: *See—*
Boshagen, Horst; Horlein, Ulrich; Reinhardt, Gerd; Seuter, Friedel; and Perzborn, Elisabeth, 4,590,291, Cl. 560-64.000.
Peterson, Jack E.: *See—*
Dupree, James N.; and Peterson, Jack E., 4,589,774, Cl. 356-436.000.
Pfaff Industriemaschinen GmbH: *See—*
Dusch, Albert, 4,589,362, Cl. 112-292.000.
Willenbacher, Erich; and Jehle, Fritz, 4,589,363, Cl. 112-308.000.
Pfeuffer, Reinhard: *See—*
Schnelle, Eberhard; Jung, Hans-Ulrich; Mussler, Rudiger; and Pfeuffer, Reinhard, 4,589,642, Cl. 269-325.000.
Pfizer Hospital Products Group, Inc.: *See—*
Kenna, Robert V., 4,589,883, Cl. 623-22.000.
Pfizer Inc.: *See—*
Alker, David; Cross, Peter E.; and Campbell, Simon F., 4,590,195, Cl. 514-252.000.
Barth, Wayne E., 4,590,073, Cl. 424-114.000.
Cross, Peter E.; and Dickinson, Roger P., 4,590,200, Cl. 514-357.000.
LaMattina, John L.; and Lipinski, Christopher A., 4,590,299, Cl. 568-415.000.
Pfuhl, Paul H.; Morrison, Charles E.; and Decker, Victor D., to Raytheon Company. Video display support joint. 4,589,713, Cl. 339-7.000.
Pharmuka Laboratoires: *See—*
Girot, Pierre; and Boschetti, Egisto, 4,590,424, Cl. 324-204.000.
Pharos AB: *See—*
Wiklund, Klas R.; and Johansson, Erik I., 4,590,466, Cl. 340-870.280.
Philip Morris Incorporated: *See—*
Edwards, William B., III, 4,590,278, Cl. 546-281.000.
Keritsis, Gus D., 4,589,428, Cl. 131-297.000.
Phillips, Bobby M., to Eastman Kodak Company. Process for drawfracturable yarn. 4,590,032, Cl. 264-555.000.
Phillips, Charles W., to Phillips Motor Car Corporation. Method of converting a sedan to a limousine. 4,589,181, Cl. 29-401.100.
Phillips, Emyr; and Wilson, David, to Ciba-Geigy Corporation. New salts useful as corrosion inhibitors. 4,589,992, Cl. 252-75.000.
Phillips, Leslie N.: *See—*
Murphy, David J.; and Phillips, Leslie N., 4,590,027, Cl. 264-135.000.
Phillips Motor Car Corporation: *See—*
Phillips, Charles W., 4,589,181, Cl. 29-401.100.
Phillips Petroleum Company: *See—*
Cheng, Paul J., 4,590,039, Cl. 422-150.000.
King, William R., 4,590,040, Cl. 422-156.000.
Kukes, Simon G.; and Banks, Robert L., 4,590,174, Cl. 502-219.000.
Schirmer, Robert M., 4,589,488, Cl. 166-270.000.
Sherk, Fred T.; and Hanson, Donald O., 4,589,957, Cl. 203-75.000.
Phipps, Warren W.; Kee, Richard C. E.; and Mather, T. Paul. Braking apparatus. 4,589,525, Cl. 188-2.00F.

Phoenix Aktiengesellschaft: *See*—
Horch, Frank; Brockmann, Hermann; and Fuchs, Hans-Georg, 4,589,623, Cl. 249-83.000.

Photo Acoustic Technology, Inc.: *See*—
Smith, Tennyson, 4,590,376, Cl. 250-358.100.

Piaggio & C. S.p.A.: *See*—
Gaddi, Bruno, 4,589,858, Cl. 474-12.000.

Piccolo, Dominic J.: *See*—
Wei, You C.; Cherukuri, Subraman R.; Hriscisce, Frank; Piccolo, Dominic J.; and Bilka, Kenneth P., 4,590,075, Cl. 426-5.000.

Piechota, Stanley E., Jr.; and Sparacio, Dorinda A., to Colgate-Palmolive Company. Stable flavor-containing dentifrice. 4,590,065, Cl. 424-49.000.

Pieroway, Chesley S.; Blount, Alonzo; Britton, George L.; and Krile, David J., to United States of America, Air Force. Electroluminescent (EL) remotely-controlled landing zone marker light system. 4,590,471, Cl. 340-825.690.

Pierschbacher, Michael D.; and Ruoslahti, Erkki I., to La Jolla Cancer Research Foundation. Polypeptide. 4,589,881, Cl. 623-11.000.

Pilgram, Kurt H.; and Bozarth, Gene A., to Shell Oil Company. Alkoxycarbonylthioamino-substituted triazines. 4,589,913, Cl. 71-93.000.

Pineapple Industries, Inc.: *See*—
Mendelson, Max, 4,590,381, Cl. 250-484.100.

Pinegar, Richard K., to J. R. Simplot Company. Process for preparing parfried and frozen potato products. 4,590,080, Cl. 426-441.000.

Pioneer Electronic Corporation: *See*—
Ohtaki, Kiyoshi; and Ishida, Kohji, 4,590,615, Cl. 455-304.000.

Pircher, Herbert, to Buro Patent AG. Container and cover having resilient fastening means. 4,589,567, Cl. 220-326.000.

Pitney Bowes Inc.: *See*—
Lillie, Terrance L., 4,590,557, Cl. 364-200.000.

Pittet, Alan O.; Muralidhara, Ranya; Vock, Manfred H.; Miller, Kevin P.; Luccarelli, Domenick, Jr.; and Wiener, Charles, to International Flavors & Fragrances Inc. Flavoring with cycloalkyl esters of mercaptoalkanoic acids. 4,590,082, Cl. 426-535.000.

Pitz, Harold W.: *See*—
Bond, Ralph W.; and Pitz, Harold W., 4,589,709, Cl. 312-257.00A.

PKA Pyrolyse Kraftanlagen GmbH: *See*—
Faehnle, Erich, 4,589,354, Cl. 110-246.000.

Plank, Robert R. Drawer apparatus. 4,589,711, Cl. 312-330.00R.

Plant Specialties Company: *See*—
Jones, William T., 4,589,475, Cl. 165-35.000.

Plassmeier, Horst: *See*—
Goldbeck, Heinz; Plassmeier, Horst; and Moller, Klaus, 4,589,358, Cl. 112-68.000.

Plastics, Inc.: *See*—
Pomroy, James F.; and Danley, Allen M., 4,590,351, Cl. 219-10.55F.

Plastigage Corporation: *See*—
Newling, Robert P., 4,589,796, Cl. 403-266.000.

Platte, Hans-Joachim; Voessing, Walter; Oberjatzas, Gunter; and Schroder, Ernst, to Telefunken Fernseh und Rundfunk GmbH. System for compensating signal interference in a PCM audio transmission. 4,590,531, Cl. 360-47.000.

Platz, Winfried, to Siemens Gammasonics, Inc. Counterbalanced radiation detection device. 4,590,378, Cl. 250-363.00S.

Plummer, William T., to Polaroid Corporation. Geometric LED layout for line exposure. 4,589,745, Cl. 354-4.000.

Plumridge, Anthony E. C.; and Plumridge, Gillian M. Multi-layer adhesive articles. 4,590,112, Cl. 428-71.000.

Plumridge, Gillian M.: *See*—
Plumridge, Anthony E. C.; and Plumridge, Gillian M., 4,590,112, Cl. 428-71.000.

Polansky, Carl, to RCA Corporation. Collet for die bonding. 4,589,586, Cl. 228-179.000.

Polaroid Corporation: *See*—
Norris, Philip R.; and Cocco, Vincent L., 4,589,752, Cl. 354-303.000.
Plummer, William T., 4,589,745, Cl. 354-4.000.

Policka, Stanley J. Paneling template. 4,589,211, Cl. 33-189.000.

Polit, Neil A., to Xerox Corporation. Vacuum supply control for a three pad labelling head machine. 4,589,945, Cl. 156-497.000.

Polk, Darryl R.: *See*—
Corbin, John S., Jr.; Polk, Darryl R.; and Ramirez, Ciro N., 4,589,790, Cl. 400-322.000.

Pollock Company: *See*—
Reichard, James E.; and Hamilton, Robert L., 4,589,635, Cl. 266-220.000.

Pomarolli, Thomas, to New Product Development, Inc. Dispensing mechanism. 4,589,572, Cl. 222-83.500.

Pompea, Stephen M.; Bergener, Derek W.; and Shepard, Donald F., to Martin Marietta Corporation. Optically black coating with improved infrared absorption and process of formation. 4,589,972, Cl. 204-29.000.

Pomroy, James F.; and Danley, Allen M., to Plastics, Inc. Compact portable turntable for microwave ovens. 4,590,351, Cl. 219-10.55F.

Pontagnier, Henri: *See*—
Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Prat, Gisele; and Pontagnier, Henri, 4,590,193, Cl. 514-253.000.

Ponticello, Ignazio S.: *See*—
Arter, Thomas C.; and Ponticello, Ignazio S., 4,590,151, Cl. 430-537.000.

Ponting, Michael A. F., to Springfast Limited. Sink fasteners. 4,589,170, Cl. 24-456.000.

Porche, Michael N.; and Beauregard, Louis G., to Rig Efficiency, Inc. Closed loop power factor control for power supply systems. 4,590,416, Cl. 323-205.000.

Porta Systems Corp.: *See*—
De Luca, Paul V.; and Hung, Peter, 4,590,335, Cl. 179-175.000.

Porter, Andrew W.; and Bach, Lars, to Her Majesty the Queen in right of the Province of Alberta, as represented by the Minister of Energy and Natural Resources. Static bending apparatus for grading wood panels. 4,589,288, Cl. 73-852.000.

Portland General Electric Company: *See*—
Holabeck, Gus D.; Mullen, William A.; Smith, Charles M.; and Hawthorne, V. Terrey, 4,589,348, Cl. 105-228.000.

Posch, Bernd: *See*—
Barske, Heiko; and Posch, Bernd, 4,590,568, Cl. 364-442.000.

Post, Martin F. M.: *See*—
Hoek, Arend; Post, Martin F. M.; and Minderhoud, Johannes K., 4,590,176, Cl. 502-307.000.

Potochnik, Lawrence M.; and Semethy, Kenneth F., to Westinghouse Electric Corp. Protective enclosure for splice connection. 4,590,329, Cl. 174-88.00R.

Pottier, Alain P.; Walulik, James J.; and Simmons, Ralph L., to Schlumberger Technology Corporation. Repeatedly operable electrical wet connector. 4,589,717, Cl. 339-94.00M.

Povlick, Thomas P.; and Case, Allen W., Jr., to General Electric Company. Robot navigation method for joint following. 4,590,356, Cl. 219-124.340.

Powers, Richard L.; Arkind, Kenneth D.; and Price, Richmond W., to Sanders Associates, Inc. Multiple ridge antenna. 4,590,478, Cl. 343-700.0MS.

PPG Industries, Inc.: *See*—
Beaver, Richard P., 4,589,898, Cl. 65-12.000.
Chang, Wen-Hsuan; McKeough, David T.; and Chau, Michael M., 4,590,254, Cl. 528-49.000.
Longhini, David A., 4,590,318, Cl. 570-220.000.
Mang, Raymond L., 4,590,535, Cl. 361-218.000.
Tang, Robert H.; and Crano, John C., 4,590,008, Cl. 558-264.000.

Praeg, Walter F., to United States of America, Energy. Coaxial test fixture. 4,590,423, Cl. 324-158.00F.

Prat, Gisele: *See*—
Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Prat, Gisele; and Pontagnier, Henri, 4,590,193, Cl. 514-253.000.

Preisler, Eberhard; Debrodt, Heiner; and Lieberoth, Dieter, to Hoechst Aktiengesellschaft. Activated metal anodes and a process for making them. 4,589,960, Cl. 204-37.100.

Prescher, Dieter, to VEB Kombinat Polygraph "Werner Lamberz" Leipzig. Oscillating sheet separating suction head on parallelogram linkage. 4,589,649, Cl. 271-107.000.

Pressure Science Incorporated: *See*—
Halling, Horace P., 4,589,666, Cl. 277-200.000.

Preston, William E.: *See*—
Woldy, Paul N.; Stevenson, John S.; and Preston, William E., 4,590,326, Cl. 136-233.000.

Price, Donald G. Moisture inhibitor. 4,589,852, Cl. 440-89.000.

Price, Richmond W.: *See*—
Powers, Richard L.; Arkind, Kenneth D.; and Price, Richmond W., 4,590,478, Cl. 343-700.0MS.

Prioretti, Guy: *See*—
Gilson, Jacques; Thomas, Jean M.; Prioretti, Guy; and Henry, Pierre, 4,589,633, Cl. 266-44.000.

Prisbe, Ernest J.; and McGee, Daniel P. C., to Syntex (U.S.A.) Inc. Process for preparing the cyclic phosphate ester of substituted 9-(1,3-dihydroxy-2-propoxymethyl)purines. 4,590,269, Cl. 544-276.000.

Pritchard, Eric K., to Smith, Paul Reed. String attachment means for a tuning machine. 4,589,321, Cl. 84-297.00R.

Pritchard, Frederick R.: *See*—
Boyle, George J.; and Pritchard, Frederick R., 4,589,274, Cl. 73-29.000.

PRM Energy Systems, Inc.: *See*—
Chastain, Charles E.; and King, Donald R., 4,589,355, Cl. 110-346.000.

Prochaska, Wolfgang: *See*—
Wackerle, Peter; Schulz, Ralf-Thilo; Sperber, Franz; Koletzko, Wolfram; and Prochaska, Wolfgang, 4,589,679, Cl. 280-777.000.

Procter & Gamble Company, The: *See*—
Parran, John J., Jr.; and Sakkab, Nabil Y., 4,590,066, Cl. 424-52.000.
Tucker, James R.; and Riley, Dennis P., 4,590,007, Cl. 260-409.000.
Van Tilburg, Kees J., 4,589,876, Cl. 604-385.00R.

Proffitt, John P., to Whittar Industries Ltd. Anti-theft steering wheel adapter device. 4,589,513, Cl. 180-287.000.

Pronk, Jacobus N.; Soltau, Martin; and Wieske, Theophil, to Lever Brothers Company. Fat having butter-like properties and a reduced tendency to develop graininess and process for producing such. 4,590,087, Cl. 426-603.000.

Prutec Limited: *See*—
Ottley, Thomas W., 4,590,371, Cl. 250-289.000.

Pullman Standard, Inc.: *See*—
Miller, Roy W., 4,589,346, Cl. 105-171.000.

Puls, Walter: *See*—
Heiker, Fred R.; Muller, Lutz; Puls, Walter; and Bischoff, Hilmar, 4,590,179, Cl. 514-25.000.

Purnell, John H.: *See*—
Ballantine, James A.; Gregory, Reginald; Purnell, John H.; Thomas, John M.; and Westlake, David J., 4,590,294, Cl. 560-247.000.

Quack, Jochen M.: *See—*
Rieck, Hans-Peter; Kalz, Hans-Jurgen; May, Adolf; Quack, Jochen M.; and Bucking, Hans-Walter, 4,589,988, Cl. 252-8.800.

Quaker Plastic Corporation: *See—*
Dahowski, Donald E., 4,589,237, Cl. 52-169.700.

Quality Products, Inc.: *See—*
Born, Gerald W., 4,589,563, Cl. 220-3.000.

Quaresima, Emma: *See—*
Cavazza, Claudio; De Witt, Paolo; Tinti, Maria O.; and Quaresima, Emma, 4,590,209, Cl. 514-547.000.

Quick, Harry C.; and Read, John M., to Genicom Corp. Ribbon storage and transport mechanism. 4,589,789, Cl. 400-195.000.

Quinsee, Michael J.: *See—*
Van Dal, David J., 4,589,377, Cl. 123-25.00C.

Quintric, Jean M.: *See—*
Tabourier, Remy; and Quintric, Jean M., 4,590,445, Cl. 332-18.000.

Quon, Willard L.: *See—*
Kasper, William W.; Quon, Willard L.; and Van Domelen, Timothy D., 4,590,054, Cl. 423-467.000.

R. J. Reynolds Tobacco Company: *See—*
Milhous, Leon A., Jr.; Martin, John M.; and Mansfield, Clifton T., 4,589,775, Cl. 356-439.000.

R & R Research & Development, Inc.: *See—*
Reith, Richard A., 4,590,099, Cl. 427-296.000.

Rader, Carl J. Marine navigational aid. 4,590,570, Cl. 364-452.000.

Ragaly, Istvan, to Robert Bosch GmbH. Forced air-cooled vehicular-type alternator. 4,589,855, Cl. 464-36.000.

Rallapalli, Krishna; and Kaku, Shinkyo, to Advanced Micro Devices, Inc. Picture element generator for facsimile receiver. 4,590,521, Cl. 358-261.000.

Ralph, Brian; and Mueller, Martin, to Ralph, Brian. Film cutter. 4,589,314, Cl. 83-144.000.

Ralston Purina Company: *See—*
Titcomb, Stanley T.; and Juers, Arthur A., 4,590,076, Cl. 426-62.000.

Ramachandran, Venkataraman; Davidson, Robert I.; and Maloney, John R., to Ethyl Corporation. Substituted naphthoic acid process. 4,590,010, Cl. 558-341.000.

Ramachandran, Venkataraman, to Ethyl Corporation. Process for preparing alpha-arylacrylonitriles. 4,590,012, Cl. 58-332.000.

Ramachandran, Venkataraman: *See—*
Maloney, John R.; and Ramachandran, Venkataraman, 4,590,013, Cl. 558-332.000.

Ramirez, Ciro N.: *See—*
Corbin, John S., Jr.; Polk, Darryl R.; and Ramirez, Ciro N., 4,589,790, Cl. 400-322.000.

Ramme, Maurice; and Ramme, Monte. Air jet reaction contrarotating rotor gyrodyne. 4,589,611, Cl. 244-6.000.

Ramme, Monte: *See—*
Ramme, Maurice; and Ramme, Monte, 4,589,611, Cl. 244-6.000.

Ramsey Engineering Company: *See—*
Erb, Tom L., 4,590,579, Cl. 364-558.000.

Ransom, Stephen A.; and Stickel, Tedd K., to Sperry Corporation. High density gallium arsenide source driven logic circuit. 4,590,393, Cl. 307-471.000.

Rappoldt, Louis M.: *See—*
van Gasselt, Max L. G.; and Rappoldt, Louis M., 4,589,352, Cl. 110-216.000.

Rauckman, Barbara S.: *See—*
Daluge, Susan M.; Skonezny, Paul M.; Roth, Barbara; and Rauckman, Barbara S., 4,590,271, Cl. 544-324.000.

Ray, Jimmy C.; and Mathews, H. Wayne, to Communications Technology Corp. Special circuit transfer via cable analyzer. 4,590,336, Cl. 179-175.30A.

Raychem Corporation: *See—*
Mohebban, Manoochehr; Versteegh, Willem M.; and Toy, Lester T., 4,589,939, Cl. 156-49.000.

Raynor Manufacturing Company: *See—*
Kendall, William F.; Smith, Richard A.; and Wadsworth, William, 4,589,240, Cl. 52-309.110.

Raytheon Company: *See—*
Pfuhl, Paul H.; Morrison, Charles E.; and Decker, Victor D., 4,589,713, Cl. 339-7.000.

RCA Corporation: *See—*
Alig, Roger C., 4,590,402, Cl. 313-414.000.
Alig, Roger C., 4,590,403, Cl. 313-414.000.
Ben-Dov, Oded, 4,590,479, Cl. 343-771.000.
Colacello, Michael A.; Fitzke, Emil V.; and Otto, Jack F., 4,589,902, Cl. 65-252.000.
Craft, Jack, 4,590,513, Cl. 358-31.000.
D'Amato, Ralph J., 4,590,137, Cl. 430-24.000.
D'Amato, Ralph J., 4,590,404, Cl. 313-477.00R.
Maile, Donald W., 4,590,546, Cl. 363-37.000.
Nicholson, John E.; and Gilbert, William A., 4,590,540, Cl. 361-400.000.
Nikolayuk, Nicholas; and Sikina, Thomas V., Jr., 4,590,480, Cl. 343-771.000.
Polansky, Carl, 4,589,586, Cl. 228-179.000.
Reno, Charles W., 4,590,594, Cl. 369-45.000.
Smollin, Charles F., 4,590,463, Cl. 340-703.000.
Tannery, George F., IV, 4,590,613, Cl. 455-200.000.

Read, John M.: *See—*
Quick, Harry C.; and Read, John M., 4,589,789, Cl. 400-195.000.

Real, Peter: *See—*
Burton, David P.; and Real, Peter, 4,590,456, Cl. 340-347.0DA.

Realex Corporation: *See—*
Foster, Donald D., 4,589,574, Cl. 222-153.000.

Rebhan, Dieter; and Krumpholz, Hartmut, to Linde Aktiengesellschaft. Article-treating apparatus. 4,589,234, Cl. 51-417.000.

Reddy, Kalakota S.: *See—*
Hecht, Sidney M.; Lynn, David G.; and Reddy, Kalakota S., 4,590,264, Cl. 536-18.200.

Redeker, Maynard S.: *See—*
Bowman, Bonita F.; Pann, Keh; and Redeker, Maynard S., 4,590,592, Cl. 367-68.000.

Redpath, Arthur B.: *See—*
Adinolfi, Philip J.; and Redpath, Arthur B., 4,589,817, Cl. 414-729.000.

Rees, James D.: *See—*
Harrigan, Michael E.; Rees, James D.; and Deibler, Melvin E., 4,589,736, Cl. 350-413.000.

Reese, Darrell D.: *See—*
Ferguson, Sam; and Reese, Darrell D., 4,589,979, Cl. 208-263.000.

Reeves, Robert: *See—*
Chevalet, Jean; and Reeves, Robert, 4,590,609, Cl. 382-50.000.

Regan, A. Michael, to Hughes Tool Company. Energized seal for upper termination. 4,589,689, Cl. 285-24.000.

Regan, Robert J.: *See—*
Butler, Scott J.; Regan, Robert J.; and Varallo, Anthony B., 4,590,436, Cl. 330-277.000.
Butler, Scott J.; Regan, Robert J.; and Varallo, Anthony B., 4,590,437, Cl. 330-277.000.

Regazzi, Renzo, to O.M.V.L. s.r.l. Gas bottle valve incorporating a gas bleed-out device, particularly for use on gas operated motor vehicle. 4,589,443, Cl. 137-588.000.

Regency Electronics, Inc.: *See—*
Zelenz, Martin L., 4,590,519, Cl. 358-120.000.

Regie Nationale des Usines Renault: *See—*
Jourde, Jean-Pierre; and Miettaux, Marc, 4,589,393, Cl. 123-460.000.

Regnault, Luc; and Maingaud, Jean-Paul, to Imaje S.A. Ink jet printer with charging control of ink-drop flow velocity. 4,590,483, Cl. 346-1.100.

Regnier, John A.; and Savage, Edward, to Eaton Corporation. Automatic calibration system for distance measurement receivers. 4,590,477, Cl. 343-17.700.

Regnier, Kent E.: *See—*
Kikta, Donald D.; and Regnier, Kent E., 4,590,344, Cl. 200-291.000.

Rehklau, George D.; Cotterill, Lee A.; and Langevin, Robert Z., to Electro Sound, Inc. Cassette loading apparatus. 4,589,608, Cl. 242-195.000.

Reichard, James E.; and Hamilton, Robert L., to Pollock Company. Porous plug retainer. 4,589,635, Cl. 266-220.000.

Reichenauer, Ansgar: *See—*
Albert, Gert; Kamps, Manfred; Noweck, Klaus; Reichenauer, Ansgar; Scherf, Erich; and Ziegler, Udo, 4,590,289, Cl. 556-188.000.

Reilly Tar & Chemical Corp.: *See—*
Toomey, Joseph E., Jr., 4,589,968, Cl. 204-257.000.

Reiners, Franz-Josef; Knors, Herbert; Tholen, Leo; and Toputt, Heinz-Lorenz, to W. Schlafhorst & Co. Automatic winding machine. 4,589,602, Cl. 242-35.50R.

Reinhardt, Gerd: *See—*
Boshagen, Horst; Horlein, Ulrich; Reinhardt, Gerd; Seuter, Friedel; and Perzborn, Elisabeth, 4,590,291, Cl. 560-64.000.

Reiss, Karl: *See—*
Buehler, Werner; Mennicke, Stefan; Reiss, Karl; and Terharn, Susanne, 4,590,136, Cl. 429-104.000.

Reiter, Udo; and Lehmann, Helmut, to Dr. Beck & Co. Aktiengesellschaft. Impregnation of thread-covered wires and braided conductors by extrusion of thermoplastics. 4,590,025, Cl. 264-103.000.

Reith, Richard A., to R & R Research & Development, Inc. Fibrous web saturator. 4,590,099, Cl. 427-296.000.

Relihan, Gary F.; Grass, Joseph J.; and Neitzell, Jerry L., to General Electric Company. Automatic X-ray entrance dose compensation. 4,590,603, Cl. 378-108.000.

Remo, Inc.: *See—*
Belli, Remo; and Hartry, Donald R., 4,589,323, Cl. 84-411.00R.

Remy, David C., to Merck & Co., Inc. N-(2-imidazolidinylidene)-5H-dibenzo[a,d]cycloheptен-5-amine compounds and α_2-adrenergic antagonistic uses thereof. 4,590,202, Cl. 514-392.000.

Renaux, Charley: *See—*
Artaud, Robert; Aubert, Michel; and Renaux, Charley, 4,589,375, Cl. 122-504.000.

Renegar, Charles G.; and Agee, Russell D., to Empire Enterprises, Inc. System for automatically painting pencils. 4,589,367, Cl. 118-66.000.

Reno, Charles W., to RCA Corporation. Side-spot focus apparatus for optical disc recording and/or playback system. 4,590,594, Cl. 369-45.000.

Research Corporation: *See—*
Park, Jin Y., 4,589,782, Cl. 374-14.000.

Resnick, Paul R., to Du Pont de Nemours, E. I., and Company. Fluorinated polyether carboxylic acid fluorides. 4,590,015, Cl. 260-544.00F.

Reumann, Ralf-Dieter: *See—*
Marx, Karl; Offermann, Peter; Reumann, Ralf-Dieter; Magel, Matthias; Frenzel, Bertram; and Grenzendorfer, Dietmar, 4,589,169, Cl. 19-304.000.

Reuschenbach, Hermann: *See—*
Hoenigs, Michael; and Reuschenbach, Hermann, 4,589,172, Cl. 24-602.000.

Revere Copper and Brass Incorporated: *See*—
Drosdick, Joseph W., 4,589,938, Cl. 148-435.000.
Rewcastle, Gordon W.: *See*—
Atwell, Graham J.; Baguley, Bruce C.; Denny, William A.; and Rewcastle, Gordon W., 4,590,277, Cl. 546-105.000.
Reynolds Metals Company: *See*—
Lee, Harry W., Jr.; and Wallace, Joseph W., 4,589,270, Cl. 72-348.000.
Rheinmetall GmbH: *See*—
Hellwig, Rolf; Seidensticker, Jens; and Karius, Klaus D., 4,589,340, Cl. 102-293.000.
Rheon Automatic Machinery Co., Ltd.: *See*—
Hayashi, Torahiko, 4,589,833, Cl. 425-306.000.
Rhone-Poulenc Chimie de Base: *See*—
Chevallier, Yvonick; and Morawski, Jean-Claude, 4,590,052, Cl. 423-335.000.
Rhone-Poulenc Sante: *See*—
Corbet, Jean-Pierre; Cotrel, Claude; Farge, Daniel; and Paris, Jean-Marc, 4,590,004, Cl. 530-317.000.
Rhone-Poulenc Specialites Chimiques: *See*—
Cassat, Robert, 4,590,115, Cl. 428-174.000.
Cordier, Georges, 4,590,309, Cl. 568-842.000.
Rhyne & Company: *See*—
Rhyne, Steven B., 4,590,610, Cl. 383-23.000.
Rhyne, Steven B., to Rhyne & Company. Hanging product display packages. 4,590,610, Cl. 383-23.000.
Rhythm Watch Co., Ltd.: *See*—
Takebe, Katsuhiko, 4,589,780, Cl. 368-245.000.
Riccardo, Mattei; and Belvederi, Bruno, to G.D. Societa per Azioni. Device for automatically supplying reels of wrapping material to a utilizer machine. 4,589,811, Cl. 414-224.000.
Rice, M. John, Jr.: *See*—
Lesk, Israel A.; Rice, M. John, Jr.; and Sarma, Kalluri R., 4,590,024, Cl. 264-81.000.
Richard, Michael A.; Vanderspurt, Thomas H.; and Montagna, Angelo A., to Exxon Research and Engineering Co. Method for preparing dual colloid catalyst compositions. 4,590,177, Cl. 502-328.000.
Richard, Pierre, to Bouygues. Apparatus for the construction of a bridge floor and similar structures, and constructions which are obtained. 4,589,157, Cl. 14-73.000.
Richards, Eric J.: *See*—
Scott-Jackson, Dennis L.; Russell, Grant N.; and Richards, Eric J., 4,590,339, Cl. 200-6.00A.
Richter, Peter: *See*—
Schornick, Gunnar; Jun, Mong-Jon; Sanner, Axel; Lehner, August; Lenz, Werner; Richter, Peter; and Eckell, Albrecht, 4,590,144, Cl. 430-273.000.
Ricoh Company: *See*—
Aoki, Mitsuo; Inoue, Satoru; Yamaguchi, Kimitoshi; Uchida, Mitsuru; Tomita, Masami; and Uematsu, Chiaki, 4,590,141, Cl. 430-108.000.
Ricoh Company, Ltd.: *See*—
Ishima, Kazumi, 4,590,362, Cl. 219-497.000.
Matsushita, Yoh, 4,590,484, Cl. 346-76.0PH.
Morita, Yoshiharu, 4,589,579, Cl. 222-561.000.
Obu, Makoto, 4,589,730, Cl. 350-267.000.
Ricoh Electronics, Inc.: *See*—
Shibata, Tomoo; Jurdi, Wissam J.; and Nomura, Minoru, 4,590,497, Cl. 346-201.000.
Rieck, Hans-Peter; Kalz, Hans-Jurgen; May, Adolf; Quack, Jochen M.; and Bucking, Hans-Walter, to Hoechst Aktiengesellschaft. Softener-containing washing agent. 4,589,988, Cl. 252-8.800.
Riedel, Kenneth E.; and Doerschner, David L., to Hollister Incorporated. External male catheter and applicator collar therefor. 4,589,874, Cl. 604-349.000.
Riediker, Martin; Roth, Martin; Buhler, Niklaus; and Berger, Joseph, to Ciba-Geigy Corporation. Fluorinated titanocenes and photopolymerizable composition containing same. 4,590,287, Cl. 556-53.000.
Riehm, Theodor: *See*—
Erckel, Rudiger; Franz, Raimund; Woernle, Rolf; and Riehm, Theodor, 4,589,924, Cl. 127-37.000.
Rieper, Wolfgang: *See*—
Hunger, Klaus; and Rieper, Wolfgang, 4,589,921, Cl. 106-288.00Q.
Ries, Gunter; and Siebold, Horst, to Siemens Aktiengesellschaft. Magnetic device of apparatus in nuclear spin tomography with a shielding device. 4,590,452, Cl. 335-301.000.
Rig Efficiency, Inc.: *See*—
Porche, Michael N.; and Beauregard, Louis G., 4,590,416, Cl. 323-205.000.
Rigal, Luc: *See*—
Gaset, Antoine; Rigal, Luc; Paillassa, Gilles; Salome , Jean-Paul; and Fleche, Guy, 4,590,283, Cl. 549-488.000.
Rigberg, Allan; and Lewis, Jeffrey. Hygienic dispenser for wafers. 4,589,575, Cl. 221-198.000.
Righetti, Roland: *See*—
Cabestany, Jean; Siegel, Daniel; and Righetti, Roland, 4,590,249, Cl. 526-287.000.
Riley, Dennis P.: *See*—
Tucker, James R.; and Riley, Dennis P., 4,590,007, Cl. 260-409.000.
Ring, Hans: *See*—
Nilsson, Erik W.; Brunnegard, Ake; and Ring, Hans, 4,589,793, Cl. 403-13.000.
Ringer, Frederick C., Jr., to International Business Machines Corporation. Inverted apply using bubble dispense. 4,590,094, Cl. 427-82.000.
Rio Linda Chemical Co., Inc.: *See*—
Hicks, Bruce W., 4,590,057, Cl. 423-477.000.
Rittscher, Dieter: *See*—
Baatz, Henning; Rittscher, Dieter; and Lur, Hans-Joachim, 4,590,000, Cl. 252-633.000.
Rives, Joe F.; and Carson, Forrest L., to J. M. Huber Corporation. Pressure responsive safety interlock. 4,589,566, Cl. 220-316.000.
Robaldo, Aldo M. Plug for damping vibrations of tennis racket cords. 4,589,662, Cl. 273-73.00D.
Robert Bosch GmbH: *See*—
Erat, August, 4,590,614, Cl. 455-270.000.
Leiber, Heinz, 4,589,511, Cl. 180-197.000.
Leiber, Heinz, 4,589,706, Cl. 303-114.000.
Ragaly, Istvan, 4,589,855, Cl. 464-36.000.
Schauwecker, Frieder; and Weber, Walter, 4,590,542, Cl. 362-61.000.
Sieber, Albrecht; and Wawretzko, Joachim, 4,589,391, Cl. 123-357.000.
Stumpp, Gerhard; Hofmann, Karl; Treiber, Jurgen; and Wellein, Horst, 4,589,596, Cl. 239-397.500.
Wirz, Josef, 4,589,392, Cl. 123-357.000.
Roberts, John T.: *See*—
Kunreuther, Steven J.; and Roberts, John T., 4,589,583, Cl. 227-43.000.
Roberts, Richard W., to Borg-Warner Corporation. Continuously variable transmission with synchronous shift. 4,589,303, Cl. 74-689.000.
Roberts, Tiner E., to Flo-Bob Industries Inc. Apparatus and process for dry cutting of plastic optical lenses. 4,589,231, Cl. 51-124.00L.
Robertshaw Controls Company: *See*—
Emplit, Raymond H., 4,590,575, Cl. 364-509.000.
Robich, James M.: *See*—
Thomas, Samuel J.; Robich, James M.; and Hayes, Robert L., 4,589,275, Cl. 73-40.50R.
Robisch, Herman; and Kroll, Arthur T., to Graco Inc. Rotary atomizer spray painting device. 4,589,597, Cl. 239-703.000.
Robotic Vision Systems, Inc.: *See*—
Ross, Joseph; and Schmidt, Richard, 4,590,367, Cl. 250-205.000.
Rock, Erich; and Brunner, Josef, to Julius Blum Gesellschaft m.b.H. Fastening device. 4,589,710, Cl. 312-330.00R.
Rockwell International Corporation: *See*—
Chang, Yi M.; and Fenwick, James R., 4,589,526, Cl. 188-74.000.
Lare, Lawrence E., 4,590,467, Cl. 340-825.500.
Rosman, Irwin E.; and Lin, Jerhong, 4,589,176, Cl. 29-156.80B.
Wagner, William R., 4,589,253, Cl. 60-204.000.
Rockwood Systems Corporation: *See*—
Clark, Charles J.; and Bennett, Edward M., 4,589,341, Cl. 102-303.000.
Rodney, Paul F., to NL Industries, Inc. Electronic noise filtering system. 4,590,593, Cl. 367-83.000.
Roeder, Stephen B. W.: *See*—
Fukushima, Eiichi; Roeder, Stephen B. W.; Assink, Roger A.; and Gibson, Atholl A. V., 4,590,427, Cl. 324-318.000.
Rogers, Harvey N., Jr.; and Hall, James T., to Hughes Aircraft Company. Photochemical process for substrate surface preparation. 4,590,091, Cl. 427-53.100.
Rogoff, Mortimer; Winkler, Peter M.; and Ackley, John N., to Navigation Sciences Inc. Navigation system including an integrated electronic chart display. 4,590,569, Cl. 364-452.000.
Rohde, Frederick W.: *See*—
Chen, Pi-Fuay; Seemuller, William W.; and Rohde, Frederick W., 4,590,608, Cl. 382-43.000.
Rohrer, Gene D., to International Business Machines Corporation. Multi-function image processing system. 4,590,606, Cl. 382-7.000.
Roller, George J., to Xerox Corporation. Top vacuum corrugation feeder with a valveless feedhead. 4,589,647, Cl. 271-94.000.
Rondot, Jack; and Casacci, Severin, to NEYRPIC. High-head multistage pump-turbine. 4,589,821, Cl. 415-111.000.
Rooks, James B.: *See*—
Adams, Isabelle M.; Carlson, James M.; Rooks, James B.; and Yeshaya, Amalia, 4,589,420, Cl. 128-702.000.
Roop, Conard J.: *See*—
Anderson, Thomas T.; Roop, Conard J.; Schmidt, Kenneth J.; and Brewer, John, 4,590,431, Cl. 324-443.000.
Roquette Freres: *See*—
Gaset, Antoine; Rigal, Luc; Paillassa, Gilles; Salome , Jean-Paul; and Fleche, Guy, 4,590,283, Cl. 549-488.000.
Rorer, Morris P., to Du Pont de Nemours, E. I., and Company. Benzofuran and benzothiophene sulfonamides. 4,589,909, Cl. 71-90.000.
Rosamilia, Peter L.; and Davidowich, George, to Air Products and Chemicals, Inc. Low temperature curing of nonwoven products bonded with N-methylolacrylamide-containing copolymers. 4,590,102, Cl. 427-374.100.
Rose, Frank M., Jr.: *See*—
Christiansen, Robert A.; Rose, Frank M., Jr.; Smith, James R.; and Woosley, Kenneth D., 4,589,584, Cl. 228-110.000.
Rose Manufacturing Company: *See*—
Olson, Wayne L.; and Hensley, Billy R., 4,589,523, Cl. 182-234.000.
Rosenbush, David M.: *See*—
Zwicke, Philip E.; Rosenbush, David M.; and Couch, Robert P., 4,590,562, Cl. 364-431.020.
Rosenkranz, Otto; Horwege, Claus; and Hone, Norbert, to Krupp Corpoplast Maschinenbau GmbH. Process for making a multilayered parison of thermoplastic material. 4,590,028, Cl. 264-154.000.
Rosenthal, Eli: *See*—
Bedell, John R.; Friedmann, Paul G.; Kushnick, Julian H.; Rosenthal, Eli; Hubbard, James R.; and Zingler, Christian J., 4,589,470, Cl. 164-463.000.

Rosman, Irwin E.; and Lin, Jerhong, to Rockwell International Corporation. Fiber-composite turbine blade and method for its construction. 4,589,176, Cl. 29-156.80B.

Ross, Joseph; and Schmidt, Richard, to Robotic Vision Systems, Inc. Arrangement for the expansion of the dynamic range of optical devices. 4,590,367, Cl. 250-205.000.

Ross, Peter W.: *See*—
Needham, Barbara; and Ross, Peter W., 4,589,734, Cl. 350-336.000.

Roth, Barbara: *See*—
Daluge, Susan M.; Skonezny, Paul M.; Roth, Barbara; and Rauckman, Barbara S., 4,590,271, Cl. 544-324.000.

Roth, Martin: *See*—
Riediker, Martin; Roth, Martin; Buhler, Niklaus; and Berger, Joseph, 4,590,287, Cl. 556-53.000.

Rothfjell, Rolf E., to Esselte Security Systems AB. Method of securing simple codes. 4,590,366, Cl. 235-494.000.

Rotta, James W., Jr. Tap and drill guide. 4,589,806, Cl. 408-72.00R.

Roule, Richard L.: *See*—
Kimball, John J.; Kirk, Harry V.; Roule, Richard L.; Sennett, Richard C.; and Sorbo, Peter J., 4,589,943, Cl. 156-256.000.

Rousseau, David G., to United States of America, Navy. Rocket-powered training missile with impact motor splitting device. 4,589,342, Cl. 102-377.000.

Rouverol, William S. Low transmission error gearing. 4,589,300, Cl. 74-462.000.

Rovati, Philippe; Jourdain, Claude; and de Witte, Olivier, to Compagnie Industrielle des Lasers Cilas Alcatel. Apparatus for detection of an enemy's infrared camera. 4,590,375, Cl. 250-348.000.

Roxlo, Charles B.; and Persans, Peter D., to Exxon Research and Engineering Co. Superlattice piezoelectric devices. 4,590,399, Cl. 310-334.000.

Roy, Jeffery J., to Atlantic Richfield Company. Ultrasonic scribing of thin film solar cells. 4,589,194, Cl. 29-583.000.

Royal Biken Company, Ltd.: *See*—
Honda, Mikio, 4,589,432, Cl. 132-88.700.

Rozniecki, Edward J. Fire suppressant valve using a floating poppet. 4,589,496, Cl. 169-20.000.

RPR Filtration Systems, Inc.: *See*—
Nukala, August R.; Perez, Arthur; and Brumfield, Timothy L., 4,589,955, Cl. 196-114.000.

Rubner, Roland: *See*—
Ahne, Hellmut; Kleeberg, Wolfgang; Rubner, Roland; and Kruger, Hans, 4,590,103, Cl. 427-387.000.

by Ruddock, William U., administrator; and Weston, Henry C., deceased. Horse training halter. 4,589,248, Cl. 54-24.000.

Rudman, Peter S.: *See*—
Goodell, Paul D.; Huston, Ernest L.; Rudman, Peter S.; and Sandrock, Gary D., 4,589,919, Cl. 75-251.000.

Ruhrchemie Aktiengesellschaft: *See*—
Morguet, Hermann; Hobes, John; Spaleck, Walter; and Payer, Wolfgang, 4,590,247, Cl. 526-124.000.

Ruoslahti, Erkki I.: *See*—
Pierschbacher, Michael D.; and Ruoslahti, Erkki I., 4,589,881, Cl. 623-11.000.

Russell, Charles R.: *See*—
Peifer, Gary S.; and Russell, Charles R., 4,589,639, Cl. 267-150.000.

Russell, Grant N.: *See*—
Scott-Jackson, Dennis L.; Russell, Grant N.; and Richards, Eric J., 4,590,339, Cl. 200-6.00A.

Ryan, James M., to Falcon Jet Corporation. Expandable volume lavatory. 4,589,463, Cl. 160-88.000.

Ryer, Jack; Shih, Chung Kun; and Williams, John E., to Exxon Research & Engineering Co. Process for the solubilization of mercaptobenzothiazole in a lubricating oil composition. 4,589,991, Cl. 252-47.000.

Ryer, Jack: *See*—
Cleveland, William K. S.; Ryer, Jack; and Deen, Harold E., 4,589,993, Cl. 252-78.500.

S. A. Martin: *See*—
Torti, Mario; and Capdeboscq, Bernard, 4,589,944, Cl. 156-359.000.

Sable, Donald E. Rod centralizer. 4,589,483, Cl. 166-176.000.

Sado, Ichiro, to Canon Kabushiki Kaisha. Electronic apparatus having dictionary function. 4,590,560, Cl. 364-419.000.

Saegusa, Takashi, to Nippon Kogaku K. K. Method and apparatus for the automatic control of exposure in camera. 4,589,756, Cl. 354-432.000.

Safe-T-Jack, Inc.: *See*—
Arzouman, Harry H., 4,589,630, Cl. 254-7.00B.

Saikei Giken Kogyo Kabushiki Kaisha: *See*—
Fukuda, Masuo, 4,589,517, Cl. 181-265.000.

St.Amand, Elmer F., to Saint Amand Manufacturing Co. Tube sealing apparatus. 4,589,835, Cl. 425-392.000.

Saint Amand Manufacturing Co.: *See*—
St.Amand, Elmer F., 4,589,835, Cl. 425-392.000.

Saint, David, to Graco Metal Products, Inc. Infant swing carriage support. 4,589,657, Cl. 272-85.000.

Saint-Gobain Vitrage: *See*—
Gillner, Manfred; Friedrich, Hans G.; Grau, Christian; Crumbach, Richard; Scholl, Heinz; and Hiemenz, Christian, 4,590,030, Cl. 264-331.190.

Saito, Etsuro, to Sony Corporation. Magnetic disk assembly cartridge for same and recording/reproducing apparatus for use with same. 4,590,532, Cl. 360-133.000.

Saito, Hiroyuki: *See*—
Inoue, Takeshi; Saito, Hiroyuki; Takewaka, Tomoyuki; and Funabashi, Hiroshi, 4,589,516, Cl. 181-256.000.

Saito, Keichiro: *See*—
Itaba, Yasushi; Saito, Keichiro; Tabuchi, Jyoichi; and Yoshizawa, Masao, 4,590,020, Cl. 264-22.000.

Saito, Kenichi: *See*—
Maeda, Yuji; Yamato, Hideyuki; Fujii, Takayoshi; Kobayashi, Yasuhiko; Saito, Kenichi; Kato, Tadaaki; and Yoshikumi, Chikao, 4,590,184, Cl. 514-167.000.

Saito, Kenichiro; Heller, Jorge; and Skinner, Wilfred A., to Nitto Electric Industrial Co., Ltd. Method for percutaneously administering physiologically active agents using an alcohol adjuvant and a solvent. 4,590,190, Cl. 514-221.000.

Saito, Morikuni: *See*—
Yahagi, Masakichi; Igaki, Tetsuo; Yosinaka, Sinzi; Morita, Kousaku; Saito, Morikuni; and Kinoshita, Kimiaki, 4,590,498, Cl. 346-208.000.

Saito, Shigeki; and Urabe, Shuuji, to Nippon Telegraph & Telephone Corporation. Variable high frequency oscillator. 4,590,442, Cl. 331-107.00A.

Saito, Shinichi: *See*—
Inoue, Hiromichi; Saito, Shinichi; Terashima, Kanetsugu; Inukai, Takashi; and Furukawa, Kenji, 4,589,996, Cl. 252-299.650.

Saito, Yoshihiro: *See*—
Yanagi, Masaaki; Ono, Satoshi; Toda, Takao; Kashiwagi, Kazuo; Endo, Makoto; and Saito, Yoshihiro, 4,589,767, Cl. 355-45.000.

Saitou, Sinichi: *See*—
Kobayashi, Minoru; Saitou, Sinichi; and Kitajima, Goro, 4,589,607, Cl. 242-180.000.

Saji, Yoshiaki: *See*—
Hiraga, Kentaro; and Saji, Yoshiaki, 4,590,189, Cl. 514-212.000.

Sajja, Vijay M.; and Mathew, Ranjan, to National Semiconductor Corporation. Solder plating process and semiconductor product. 4,589,962, Cl. 204-15.000.

Sakakibara, Shumpei; Yugari, Yasumi; and Hashimoto, Shigebumi, to Ajinomoto Company, Incorporated. Amino acid derivatives, methods of preparing said derivatives and antihypertensive drugs containing them. 4,590,178, Cl. 514-18.000.

Sakakima, Hiroshi; Satomi, Mitsuo; Yanagiuchi, Yukihiro; and Senno, Harufumi, to Matsushita Electric Industrial Co., Ltd. Magnetic head. 4,590,530, Cl. 360-122.000.

Sakamoto, Seiichi: *See*—
Sato, Tadashi; Sakamoto, Seiichi; and Terauchi, Kiyoshi, 4,589,828, Cl. 418-55.000.

Sakamoto, Takao, to Tachikawa Spring Co., Ltd. Seat with an air suspension. 4,589,620, Cl. 248-550.000.

Sakamoto, Yukio, to Murata Manufacturing Co., Ltd. Laminated capacitor of feed-through type. 4,590,537, Cl. 361-306.000.

Sakane, Kazuo: *See*—
Takaya, Takao; Sakane, Kazuo; and Yamanaka, Hideaki, 4,590,186, Cl. 514-202.000.

Sakanoue, Akira: *See*—
Kita, Yasushi; Nakano, Hisaji; Moroi, Shiro; and Sakanoue, Akira, 4,590,316, Cl. 570-150.000.

Sakemi, Yuji: *See*—
Toyono, Tsutomu; Sakemi, Yuji; and Fujii, Haruo, 4,590,496, Cl. 346-153.100.

Sakitani, Yoshio: *See*—
Ido, Satoshi; Fujinami, Minpei; Kato, Yasuo; Sakitani, Yoshio; and Ozasa, Susumu, 4,589,773, Cl. 356-371.000.

Sakkab, Nabil Y.: *See*—
Parran, John J., Jr.; and Sakkab, Nabil Y., 4,590,066, Cl. 424-52.000.

Sakoda, Lester M., to Getty Synthetic Fuels, Inc. Method of controlling the removal of flowable material from a well. 4,589,494, Cl. 166-372.000.

Sakurada, Kazuyuki; Fujiwara, Takanori; and Funyu, Yutaka, to Kawasaki Steel Corporation. Method of controlling mill pacing. 4,589,268, Cl. 72-8.000.

Sakurai, Akihiro: *See*—
Obara, Haruki; Izumiya, Shunzo; Okuyama, Yuji; and Sakurai, Akihiro, 4,590,353, Cl. 219-69.00C.

Sakurai, Kaoru: *See*—
Yoshizawa, Hideo; Nushi, Masaaki; Sakurai, Kaoru; Usui, Hirotaro; Iida, Naohiro; Tanaka, Togo; and Honjo, Seiichiro, 4,589,901, Cl. 65-107.000.

Sakurai, Yoshimi: *See*—
Nishikawa, Masao; Sakurai, Yoshimi; Aoki, Takashi; and Sato, Yoichi, 4,589,537, Cl. 192-0.052.

Salama, Mamdouh M., to Conoco Inc. Composite mooring element for deep water offshore structures. 4,589,801, Cl. 405-224.000.

Saljuk, Viktor A.: *See*—
Malyshev, Boris N.; Saljuk, Viktor A.; Skobelkin, Oleg X.; Brekhov, Evgeny I.; Smirnov, Boris A.; Korolkov, Ivan A.; Bashilov, Viktor P.; and Ivanova, Tatyana L., 4,589,413, Cl. 128-305.000.

Salome , Jean-Paul: *See*—
Gaset, Antoine; Rigal, Luc; Paillassa, Gilles; Salome , Jean-Paul; and Fleche, Guy, 4,590,283, Cl. 549-488.000.

Salomon S.A.: *See*—
Dimier, Jean-Pierre; and Pascal, Roger, 4,589,673, Cl. 280-630.000.

Salter, Martin de G.; and Hynd, John G. S., to Cementation Company of America, Incorporated. Earth boring apparatus. 4,589,502, Cl. 175-102.000.

Sampson, Robert C.; and Flanigan, Sean T., to Wasco Products, Inc. Skylight sealing. 4,589,238, Cl. 52-200.000.

Sanchez Aguilar, Ricardo B.; Mendez, Francisco R.; Equihua Zamora, Luis F.; and Soto Curiel, Carlos D. Spout operated valve. 4,589,445, Cl. 137-616.700.

Sanden Corporation: *See*—
Sato, Tadashi; Sakamoto, Seiichi; and Terauchi, Kiyoshi, 4,589,828, Cl. 418-55.000.

Sander, Jorg, to U.S. Philips Corporation. Load cell with centrally located strain gauge. 4,589,291, Cl. 73-862.650.

Sanders Associates, Inc.: *See*—
Powers, Richard L.; Arkind, Kenneth D.; and Price, Richmond W., 4,590,478, Cl. 343-700.0MS.

Sandoz Ltd.: *See*—
Henrick, Clive A., 4,590,282, Cl. 549-453.000.

Sandrock, Gary D.: *See*—
Goodell, Paul D.; Huston, Ernest L.; Rudman, Peter S.; and Sandrock, Gary D., 4,589,919, Cl. 75-251.000.

Sanjana, Zal N.; and Marchetti, Joseph R., to Westinghouse Electric Corp. Polyaramid laminate. 4,590,539, Cl. 361-400.000.

Sanjurjo, Angel, to SRI International. Apparatus for obtaining silicon from fluosilicic acid. 4,590,043, Cl. 422-189.000.

Sanner, Axel: *See*—
Schornick, Gunnar; Jun, Mong-Jon; Sanner, Axel; Lehner, August; Lenz, Werner; Richter, Peter; and Eckell, Albrecht, 4,590,144, Cl. 430-273.000.

Sano, Tsutomu: *See*—
Kurumaji, Masanobu; Sano, Tsutomu; Kondo, Hiroaki; Mizutani, Masao; and Yodono, Kazuei, 4,589,839, Cl. 425-547.000.

Santrade Ltd.: *See*—
Danielsson, Mats, 4,589,306, Cl. 76-112.000.

Sapre, Ajit V., to Mobil Oil Corporation. Conversion of methanol to olefins in a tubular reactor with light olefin co-feeding. 4,590,320, Cl. 585-324.000.

Sarma, Kalluri R.: *See*—
Lesk, Israel A.; Rice, M. John, Jr.; and Sarma, Kalluri R., 4,590,024, Cl. 264-81.000.

Sasage, Yoshihiro: *See*—
Watanabe, Takashi; and Sasage, Yoshihiro, 4,589,771, Cl. 356-38.000.

Sasaki, Hideharu: *See*—
Yamada, Yasuhiro; Imamura, Takeshi; Honda, Hidemasa; Sawaki, Toru; and Sasaki, Hideharu, 4,590,055, Cl. 423-447.400.

Sasaki, Kazuhiko: *See*—
Amano, Akira; and Sasaki, Kazuhiko, 4,589,251, Cl. 56-202.000.

Sasaki, Keiji: *See*—
Tsuruoka, Mitsuharu; and Sasaki, Keiji, 4,590,528, Cl. 360-94.000.

Sasaki, Kouji: *See*—
Kawakubo, Yukio; Sugawara, Hiroyuki; Kuwabara, Kouji; Shirakura, Toshiharu; Takemori, Satoshi; and Sasaki, Kouji, 4,590,599, Cl. 372-87.000.

Sasaki, Yutaka; Nakamura, Toshio; Utsumi, Hiroshi; Murata, Hiroshi; and Nakamura, Yoshimi, to Nitto Chemical Industry Co., Ltd. Process for producing antimony-containing oxide catalyst supported on silica for use in fluidized bed reaction. 4,590,173, Cl. 502-204.000.

Sasaki, Yutaka; Utsumi, Hiroshi; Mori, Kunio; Yamamoto, Hiroshi; Nakamura, Yoshimi; Moriya, Kiyoshi; Morii, Akimitsu; Noda, Mikio; and Kunitani, Miki, to Nitto Chemical Industry Co., Ltd. Process for the production of antimony-containing metal oxide catalysts. 4,590,175, Cl. 502-249.000.

Sasayama, Shinichi, to Daido Tokushuko Kabushiki Kaisha. Ultra clean stainless steel for extremely fine wire. 4,589,916, Cl. 75-126.00R.

Sashital, Sanat K., to Hughes Aircraft Company. Doped and undoped single crystal multilayered structures. 4,589,737, Cl. 350-356.000.

Satake, Toshimi; Kimura, Yoshihide; and Fujimura, Fumio, to Jujo Paper Co., Ltd. Heat-sensitive recording sheet. 4,590,500, Cl. 346-209.000.

Satake, Toshimi: *See*—
Fujimura, Fumio; Satake, Toshimi; Mori, Manabu; Minami, Toshiaki; and Fukuchi, Tadakazu, 4,590,499, Cl. 346-209.000.

Satek, Larry C., to Amoco Corporation. Dehydrogenation of alkylaromatics. 4,590,324, Cl. 585-444.000.

Sato, Eiichi: *See*—
Fukui, Izumu; Hamatsuki, Takeshige; Yano, Takeshi; Sato, Eiichi; and Inui, Osamu, 4,589,786, Cl. 400-124.000.

Sato, Kozo; and Naito, Hideki, to Fuji Photo Film Co., Ltd. Heat-developable color light-sensitive material. 4,590,152, Cl. 430-543.000.

Sato, Masafumi, to Tokyo Electric Co., Ltd. Printing apparatus. 4,589,785, Cl. 400-61.000.

Sato, Osamu; and Yamaguchi, Kazuo, to Honda Giken Kogyo Kabushiki Kaisha. Power transmission mechanism. 4,589,296, Cl. 74-411.000.

Sato, Shinobu: *See*—
Nio, Satoru; Hamashima, Toyoji; and Sato, Shinobu, 4,590,577, Cl. 364-513.000.

Sato, Tadashi; Sakamoto, Seiichi; and Terauchi, Kiyoshi, to Sanden Corporation. Rotation preventing device for an orbiting member of a fluid displacement apparatus. 4,589,828, Cl. 418-55.000.

Sato, Toshihiko: *See*—
Asano, Kajio; Sato, Toshihiko; Oda, Haruo; Abe, Yasuaki; and Watanabe, Yoshitaka, 4,589,184, Cl. 29-430.000.

Sato, Toshiya: *See*—
Yamaguchi, Yuzo; and Sato, Toshiya, 4,590,215, Cl. 514-729.000.

Sato, Yoichi: *See*—
Nishikawa, Masao; Sakurai, Yoshimi; Aoki, Takashi; and Sato, Yoichi, 4,589,537, Cl. 192-0.052.

Sato, Yoshiaki: *See*—
Ohno, Youzi; Sato, Yoshiaki; Yamashita, Yoshito; and Mizukami, Etsuo, 4,589,455, Cl. 141-311.00R.

Sato, Zenjiro; and Kazama, Kazuyosi, to Zenyuu Ltd.; and Niisei Kagaku Ltd. Method for fermentation of a stockbreeding waste. 4,589,903, Cl. 71-9.000.

Satomi, Mitsuo: *See*—
Sakakima, Hiroshi; Satomi, Mitsuo; Yanagiuchi, Yukihiro; and Senno, Harufumi, 4,590,530, Cl. 360-122.000.

Saunders, Frances C., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. Cholesteric liquid crystal mirror with safety features. 4,589,735, Cl. 350-338.000.

Savage, Edward: *See*—
Regnier, John A.; and Savage, Edward, 4,590,477, Cl. 343-17.700.

Savage, Robert L.: *See*—
Chen, Wenjai R.; and Savage, Robert L., 4,590,056, Cl. 423-449.000.

Savin Corporation: *See*—
Landa, Benzion, 4,589,761, Cl. 355-8.000.

Savit, Carl H., to Western Geophysical Co. of America. Wavelength-division-multiplexed receiver array for vertical seismic profiling. 4,589,285, Cl. 73-655.000.

Sawada, Takehiko; Miyazawa, Masanori; and Kikuchi, Noriyuki, to Ikegai Tekko Kabushiki Kaisha. Method of manufacturing foamed foodstuff. 4,590,081, Cl. 426-448.000.

Sawaki, Toru: *See*—
Yamada, Yasuhiro; Imamura, Takeshi; Honda, Hidemasa; Sawaki, Toru; and Sasaki, Hideharu, 4,590,055, Cl. 423-447.400.

Sawyer, Sammy D.: *See*—
Berger, Michael F.; and Sawyer, Sammy D., 4,590,556, Cl. 364-200.000.

Scannon, Patrick J.; Spitler, Lynn E.; Lee, Howard M.; Kawahata, Russell T.; and Mischak, Ronald P., to Xoma Corporation. Human melanoma specific immunotoxins. 4,590,071, Cl. 424-85.000.

Schad, Robert D., to Husky Injection Molding Systems Ltd. Apparatus and method for removing molded articles in uniform orientation. 4,589,840, Cl. 425-556.000.

Schaefer, Gerhard: *See*—
Zeiner, Hartmut; Fischer, Jurgen; Heinz, Gerhard; Neumann, Peter; Nissen, Dietmar; and Schaefer, Gerhard, 4,590,104, Cl. 427-389.900.

Schaeffer, Georg: *See*—
Spielmann, Werner; and Schaeffer, Georg, 4,590,295, Cl. 562-478.000.

Schaich, Wilbur A., to Centrifugal Piston Expander, Inc. Method and apparatus for extracting heat and mechanical energy from a pressured gas. 4,589,257, Cl. 60-670.000.

Schambeck, Herbert, to Dyckerhoff & Widmann Aktiengesellschaft. Support structure, particularly for a long span bridge. 4,589,156, Cl. 14-4.000.

Schauwecker, Frieder; and Weber, Walter, to Robert Bosch GmbH. Headlight for motor vehicle. 4,590,542, Cl. 362-61.000.

Schebler, Bernard J.; and Hart, Russell F., to Litton Systems, Inc. Oxygen partial pressure controller for a pressure swing adsorption system. 4,589,436, Cl. 137-115.000.

Scheer, Raymond D. Light fixture. 4,590,545, Cl. 362-392.000.

Scheffer, Hendrik J.: *See*—
van der Wal, Hans; and Scheffer, Hendrik J., 4,590,045, Cl. 422-216.000.

Scheidl, Franz; and Gscheidmeier, Manfred, to Hoechst Aktiengesellschaft. Terpene ethers. 4,590,302, Cl. 568-665.000.

Scheler, Siegfried, to Hoechst Aktiengesellschaft. Two-component diazotype material with diazonium salt with anion of benzene or toluene sulfonate. 4,590,143, Cl. 430-163.000.

Scherer, Albert R., to GTE Products Corporation. Method of winding braze strip material. 4,589,601, Cl. 242-1.000.

Scherf, Erich: *See*—
Albert, Gert; Kamps, Manfred; Noweck, Klaus; Reichenauer, Ansgar; Scherf, Erich; and Ziegler, Udo, 4,590,289, Cl. 556-188.000.

Scheunemann, Karl-Heinz; Mencke, Burkhard; Blumbach, Jurgen; Durckheimer, Walter; and Fleischmann, Klaus, to Hoechst Aktiengesellschaft. Crystalline disodium salt of cefodizim. 4,590,267, Cl. 544-27.000.

Schickedanz, Maren: *See*—
Gunther, Kurt; Martens, Jurgen; and Schickedanz, Maren, 4,590,167, Cl. 436-162.000.

Schindl, Klaus, to C. Reichert Optische Werke, AG. Microscope for observing environmentally sensitive objects. 4,589,742, Cl. 350-589.000.

Schipfer, Rudolf: *See*—
Daimer, Wolfgang; Gmoser, Johann; and Schipfer, Rudolf, 4,590,245, Cl. 525-504.000.

Schirmer, Robert M., to Phillips Petroleum Company. Method for recovery of mineral resources. 4,589,488, Cl. 166-270.000.

Schlegel, Eberhard, to Georg Schlegel, Firma. Panel mounted switching device. 4,590,342, Cl. 200-159.00b.

Schlumberger Technology Corporation: *See*—
Pottier, Alain P.; Walulik, James J.; and Simmons, Ralph L., 4,589,717, Cl. 339-94.00M.

Schmadel, Edmund: *See*—
Wuhrmann, Juan C.; Seiter, Wolfgang; Giesen, Brigitte; and Schmadel, Edmund, 4,590,237, Cl. 524-480.000.

Schmidt, Donald J., to Westinghouse Electric Corp. Guided missile subsystem. 4,589,610, Cl. 244-3.190.

Schmidt, Hans-Joachim: *See*—
Leupold, Ernst I.; Schmidt, Hans-Joachim; and Wunder, Friedrich, 4,590,217, Cl. 518-716.000.

Schmidt, Hans U.: *See—*
Nissen, Dietmar; Marx, Matthias; and Schmidt, Hans U., 4,590,219, Cl. 521-51.000.
Schmidt, Jorgen, to Knud Erik Westergaard. High-pressure cleaning unit with a bypass valve. 4,589,825, Cl. 417-290.000.
Schmidt, Kenneth J.: *See—*
Anderson, Thomas T.; Roop, Conard J.; Schmidt, Kenneth J.; and Brewer, John, 4,590,431, Cl. 324-443.000.
Schmidt, Kenneth P.: *See—*
Schmidt, Phillip M.; and Schmidt, Kenneth P., 4,589,457, Cl. 144-193.00E.
Schmidt, Phillip M.; and Schmidt, Kenneth P. Log splitter wedge construction. 4,589,457, Cl. 144-193.00E.
Schmidt, Richard: *See—*
Ross, Joseph; and Schmidt, Richard, 4,590,367, Cl. 250-205.000.
Schmitt, Jean-Claude: *See—*
Gilles, Pieter; and Schmitt, Jean-Claude, 4,590,165, Cl. 436-49.000.
Schneider, Barry L., to Hollister Incorporated. Access port forming method. 4,589,185, Cl. 29-432.000.
Schneider, Werner: *See—*
Baumer, Albrecht; Schneider, Werner; Muller-Spath, Hans-Jorg; and Brucher, Eberhard, 4,589,636, Cl. 266-271.000.
Schnelle, Eberhard; Jung, Hans-Ulrich; Mussler, Rudiger; and Pfeuffer, Reinhard, to Stierlen-Maquet AG. Operating table. 4,589,642, Cl. 269-325.000.
Schnepel, Frank-Michael: *See—*
Volz, Hartwig; and Schnepel, Frank-Michael, 4,589,489, Cl. 166-274.000.
Schneyer, Gerhard: *See—*
Mann, Bernd; Schneyer, Gerhard; and Dinkel, Emil, 4,589,297, Cl. 74-427.000.
Schoemaker, Joyce M.: *See—*
Markovitz, Alvin; Zehnbauer, Barbara A.; Schoemaker, Joyce M.; and Charette, Marc F., 4,590,159, Cl. 435-68.000.
Schoenberg, Julian H., to W. R. Grace & Co., Cryovac Div. Storm window film. 4,590,124, Cl. 428-339.000.
Schoenhard, James D., to International Technology Services, Inc. Method and apparatus for detoxification of cyanide contaminated polymeric film chips. 4,590,261, Cl. 528-488.000.
Scholl, Frederick W., to Codenoll Technology Corporation. Edge-emitting light emitting diode. 4,590,501, Cl. 357-17.000.
Scholl, Hans, to Kochs Adler AG. Workpiece receiving device for a sewing machine, in particular for a computer-controlled automatic sewing device. 4,589,359, Cl. 112-121.120.
Scholl, Heinz: *See—*
Gillner, Manfred; Friedrich, Hans G.; Grau, Christian; Crumbach, Richard; Scholl, Heinz; and Hiemenz, Christian, 4,590,030, Cl. 264-331.190.
Schonstedt, Erick O., to Schonstedt Instrument Company. Magnetic detector apparatus with excitation conductors connected in series via sensor housing. 4,590,425, Cl. 324-244.000.
Schonstedt Instrument Company: *See—*
Schonstedt, Erick O., 4,590,425, Cl. 324-244.000.
Schornick, Gunnar; Jun, Mong-Jon; Sanner, Axel; Lehner, August; Lenz, Werner; Richter, Peter; and Eckell, Albrecht, to BASF Aktiengesellschaft. Photopolymerizable recording material and the production of relief plates using this recording material. 4,590,144, Cl. 430-273.000.
Schorscher, Ernst: *See—*
Irmscher, Klaus; Jonas, Rochus; Uhl, Jurgen; and Schorscher, Ernst, 4,590,180, Cl. 514-46.000.
Schreiber, Georg; and Lob, Heinrich, to Schreiber, Georg. Fluidizing-cell column. 4,590,038, Cl. 422-142.000.
Schroder, Ernst: *See—*
Platte, Hans-Joachim; Voessing, Walter; Oberjatzas, Gunter; and Schroder, Ernst, 4,590,531, Cl. 360-47.000.
Schroder, Michael L., to Standard Oil Company (Indiana). Strip-auger method of mining thin seams of hydrocarbonaceous deposits. 4,589,700, Cl. 299-18.000.
Schulz, Ralf-Thilo: *See—*
Wackerle, Peter; Schulz, Ralf-Thilo; Sperber, Franz; Koletzko, Wolfram; and Prochaska, Wolfgang, 4,589,679, Cl. 280-777.000.
Schulze, Bernd-Guido, to Volkswagenwerk Aktiengesellschaft. Hydraulic brake pressure regulator. 4,589,703, Cl. 303-6.00R.
Schumacher, Hans; Heinrich, Rudolf; and Marks, Hans-Gunter, to Hoechst Aktiengesellschaft. Herbicidal agents. 4,589,908, Cl. 71-88.000.
Schuman, LeRoy, to Lippman-Milwaukee, Inc. Cone crusher. 4,589,600, Cl. 241-215.000.
Schutte, Horst: *See—*
Kula, Maria-Regina; Hummel, Werner; Schutte, Horst; and Leuchtenberger, Wolfgang, 4,590,161, Cl. 435-108.000.
Schwartz, Abraham; Graper, Jane; and Williams, Joel, to Becton, Dickinson and Company. Method of applying a hydrophilic coating to a polymeric substrate and articles prepared thereby. 4,589,873, Cl. 604-265.000.
Schwartz, Eduard: *See—*
Shanzer, Abraham; and Schwartz, Eduard, 4,590,005, Cl. 260-239.30R.
Schweiger, Walter: *See—*
Manz, Hermann; and Schweiger, Walter, 4,589,162, Cl. 16-115.000.
Schweinsberg, Dieter, to Datox Organisation D. Schweinsberg GmbH & Co. KG. Arrangement for filing and storage of flat-shaped articles. 4,589,544, Cl. 206-45.000.
Sciabarassi, Augustine. Reversible drainboard for a corner sink installation. 4,589,150, Cl. 4-656.000.
Scott & Fetzer Company, The: *See—*
Kochte, Werner W.; and Nimon, Susan K., 4,589,161, Cl. 15-372.000.
Scott-Jackson, Dennis L.; Russell, Grant N.; and Richards, Eric J., to Gravis Computer Peripherals Inc. Joystick. 4,590,339, Cl. 200-6.00A.
Scott, John R. A., to Vickers Shipbuilding & Engineering Limited. Method of induction hardening of gear teeth. 4,589,935, Cl. 148-147.000.
Scott, Raymond P. W., to Perkin-Elmer Corporation, The. Sample cell temperature stabilizer. 4,589,477, Cl. 165-66.000.
Scottorn Trailers Limited: *See—*
Dickens, John R., 4,589,672, Cl. 280-478.00B.
Seals, James. Color based data encoding and storage apparatus. 4,590,469, Cl. 340-347.00P.
Secolo, Nunzio; and Gualchi, Elio, to Teksid S.p.A. Method of manufacturing, without welding, light alloy rims for motor vehicles. 4,589,177, Cl. 29-159.100.
Security Systems Internationale, Inc.: *See—*
Nunemaker, Joseph P.; and Hicks, Samuel, 4,590,331, Cl. 179-5.00R.
Sedco, Inc.: *See—*
Hampton, James E., 4,589,802, Cl. 405-227.000.
Sedig, Albert R.; and Boccelli, Fred A., to ITT Corporation. Electrical connector having pin contact receptacle with releasable retaining means. 4,589,721, Cl. 339-210.00R.
Seemuller, William W.: *See—*
Chen, Pi-Fuay; Seemuller, William W.; and Rohde, Frederick W., 4,590,608, Cl. 382-43.000.
Seidensticker, Jens: *See—*
Hellwig, Rolf; Seidensticker, Jens; and Karius, Klaus D., 4,589,340, Cl. 102-293.000.
Seiko Epson Corporation: *See—*
Shiraishi, Yoshiaki; and Aoki, Kenji, 4,589,732, Cl. 350-331.00R.
Seiter, Wolfgang: *See—*
Wuhrmann, Juan C.; Seiter, Wolfgang; Giesen, Brigitte; and Schmadel, Edmund, 4,590,237, Cl. 524-480.000.
Seitetsu Kagaku Co., Ltd.: *See—*
Nakamura, Morio; Obayashi, Shigeji; Takemori, Shinichi; Tanaka, Hitoshi; and Hirakawa, Motomu, 4,590,227, Cl. 523-130.000.
Sekavec, John, Jr. Method and apparatus for adhesive or sealant application. 4,589,950, Cl. 156-578.000.
Seki, Mitsuaki; Watanabe, Satoshi; and Miyakawa, Hideaki, to Canon Kabushiki Kaisha; and Canon Denshi Kabushiki Kaisha. Printer with rotatable print band. 4,589,787, Cl. 400-145.200.
Sell, Jeffrey A., to General Motors Corporation. Nondestructive measurement of oxygen level in a tungsten-halogen incandescent bulb. 4,590,429, Cl. 324-414.000.
Seltzer, Raymond; Patel, Ambelal R.; Stewart, Peter W.; and White, Charlene, to Ciba-Geigy Corporation. Polyolefin compositions stabilized against degradation using hydroxylamine derivatives. 4,590,231, Cl. 524-100.000.
Semethy, Kenneth F.: *See—*
Potochnik, Lawrence M.; and Semethy, Kenneth F., 4,590,329, Cl. 174-88.00R.
Senmed, Inc.: *See—*
Bilotti, Federico, 4,589,582, Cl. 227-19.000.
Sennett, Richard C.: *See—*
Kimball, John J.; Kirk, Harry V.; Roule, Richard L.; Sennett, Richard C.; and Sorbo, Peter J., 4,589,943, Cl. 156-256.000.
Senno, Harufumi: *See—*
Sakakima, Hiroshi; Satomi, Mitsuo; Yanagiuchi, Yukihiro; and Senno, Harufumi, 4,590,530, Cl. 360-122.000.
Seo, Nobuhide: *See—*
Oda, Hiroyuki; Yokooku, Katsuhiko; Seo, Nobuhide; and Shiraishi, Hideo, 4,589,302, Cl. 74-866.000.
Sepreh, Inc.: *See—*
Zamore, Leonard, 4,590,214, Cl. 514-702.000.
SErono Laboratories, Inc.: *See—*
Hodgen, Gary D.; Jones, Howard W., Jr.; and Jones, Georgeanna S., 4,589,402, Cl. 128-1.00R.
Service, Alex D.: *See—*
Goldstein, Norman P.; Service, Alex D.; and Todt, William H., 4,590,401, Cl. 313-93.000.
Seton Company: *See—*
Cioca, Gheorge; Feeley, George F.; Brabson, Joseph B.; and Barth, Peter, 4,590,022, Cl. 264-41.000.
Seuter, Friedel: *See—*
Boshagen, Horst; Horlein, Ulrich; Reinhardt, Gerd; Seuter, Friedel; and Perzborn, Elisabeth, 4,590,291, Cl. 560-64.000.
Shaffer, Earl R., to Herman Rynveld's Son Corporation. Artificial tree and method of making the same. 4,590,105, Cl. 428-8.000.
Shamine, Dennis R.: *See—*
Hall, John L.; Shamine, Dennis R.; and Koenig, James P., 4,589,535, Cl. 192-70.120.
Shanzer, Abraham; and Schwartz, Eduard. Some macrocyclic compounds and their preparation. 4,590,005, Cl. 260-239.30R.
Sharman, Deborah A.: *See—*
Chantler, Eric N.; Hutchinson, Francis G.; and Sharman, Deborah A., 4,590,070, Cl. 424-78.000.
Sharp Kabushiki Kaisha: *See—*
Fujiwara, Katsuyoshi, 4,589,763, Cl. 355-14.00R.
Hatta, Koichi; and Ikemoto, Yutaka, 4,589,779, Cl. 368-74.000.
Ohno, Youzi; Sato, Yoshiaki; Yamashita, Yoshito; and Mizukami, Etsuo, 4,589,455, Cl. 141-311.00R.

Sheldon, Morris. Article cleaning device for removing surface contaminants from the article by brushing and liquid contact. 4,589,158, Cl. 15-21.00D.

Shell Oil Company: *See*—
Boyle, George J.; and Pritchard, Frederick R., 4,589,274, Cl. 73-29.000.
Drent, Eit, 4,590,311, Cl. 568-852.000.
Hoek, Arend; Post, Martin F. M.; and Minderhoud, Johannes K., 4,590,176, Cl. 502-307.000.
Mos, Arie L.; and Bukkems, Franciscus H. J., 4,590,044, Cl. 422-191.000.
Pilgram, Kurt H.; and Bozarth, Gene A., 4,589,913, Cl. 71-93.000.
van der Wal, Hans; and Scheffer, Hendrik J., 4,590,045, Cl. 422-216.000.

Shelton, Dennis L. Chair for tree stand and the like. 4,589,522, Cl. 182-187.000.

Shepard, Donald F.: *See*—
Pompea, Stephen M.; Bergener, Derek W.; and Shepard, Donald F., 4,589,972, Cl. 204-29.000.

Sher, Yuh Y. Collapsible wheeled luggage with stiffener. 4,589,530, Cl. 190-18.00A.

Sherex Chemical Company, Inc.: *See*—
Keys, Robert O., 4,589,980, Cl. 209-166.000.

Sherk, Fred T.; and Hanson, Donald O., to Phillips Petroleum Company. Monomer and diluent recovery. 4,589,957, Cl. 203-75.000.

Shiba, Keisuke: *See*—
Takahashi, Hiroshi; Tamaki, Hiroyuki; Ohishi, Chikashi; and Shiba, Keisuke, 4,590,148, Cl. 430-303.000.

Shibata, Kazumasa: *See*—
Iwasaki, Masamitsu; Suzuki, Takeshi; Koizumi, Takashi; Takahashi, Takehiko; Shibata, Kazumasa; Komori, Nobutoshi; and Shimizu, Atsuyoshi, 4,589,215, Cl. 34-182.000.

Shibata, Kiyoshi: *See*—
Imaizumi, Mamoru; and Shibata, Kiyoshi, 4,590,464, Cl. 340-711.000.

Shibata, Tomoo; Jurdi, Wissam J.; and Nomura, Minoru, to Ricoh Electronics, Inc. Heat insulated thermosensitive paper. 4,590,497, Cl. 346-201.000.

Shields, Walter. Apparatus for crimping edges of workpieces. 4,589,202, Cl. 29-822.000.

Shigeno, Masashi: *See*—
Nakayama, Yasuhiko; Takami, Fumio; and Shigeno, Masashi, 4,589,747, Cl. 354-149.110.

Shih, Chung Kun: *See*—
Ryer, Jack; Shih, Chung Kun; and Williams, John E., 4,589,991, Cl. 252-47.000.

Shima, Kouji: *See*—
Yamashita, Mitsuru; and Shima, Kouji, 4,590,266, Cl. 536-69.000.

Shimamune, Takayuki: *See*—
Nakamatsu, Syuji; and Shimamune, Takayuki, 4,589,959, Cl. 204-28.000.

Shimaoka, Keiichi: *See*—
Sugiyama, Jun; Nonomura, Yutaka; Tsukada, Kouji; Shimaoka, Keiichi; Takeuchi, Masaharu; and Takeuchi, Takashi, 4,589,290, Cl. 73-862.360.

Shimizu, Atsuyoshi: *See*—
Iwasaki, Masamitsu; Suzuki, Takeshi; Koizumi, Takashi; Takahashi, Takehiko; Shibata, Kazumasa; Komori, Nobutoshi; and Shimizu, Atsuyoshi, 4,589,215, Cl. 34-182.000.

Shimoyama, Akira: *See*—
Harada, Kaoru; and Shimoyama, Akira, 4,590,260, Cl. 528-328.000.

Shimp, Lawrence A., to FMC Corporation. Sodium tripolyphosphate manufacture. 4,590,051, Cl. 423-315.000.

Shin-Etsu Chemical Ltd.: *See*—
Kanada, Eiji; Kondo, Toshiro; and Isobe, Kenichi, 4,589,920, Cl. 106-30.000.

Shin Nisso Kako Co., Ltd.: *See*—
Yahagi, Masakichi; Igaki, Tetsuo; Yosinaka, Sinzi; Morita, Kousaku; Saito, Morikuni; and Kinoshita, Kimiaki, 4,590,498, Cl. 346-208.000.

Shinsei, Kiyoichi: *See*—
Kume, Satoru; Yoshida, Michiyasu; Konno, Yoshihiro; Kume, Tateo; Takada, Hiroaki; Shinsei, Kiyoichi; Matsumoto, Akio; and Ogawa, Hitoshi, 4,589,254, Cl. 60-286.000.

Shiokawa, Kozo; Kagabu, Shinzo; and Tsuboi, Shinichi, to Nihon Tokushu Noyaku Seizo K.K. Pesticidal 1-(substituted benzyl)-2-nitromethylene-tetrahydropyrimidines. 4,590,272, Cl. 544-335.000.

Shipbuilding Research Association, The: *See*—
Hotta, Minoru; Hara, Okitada; and Araki, Toshimitsu, 4,589,799, Cl. 405-196.000.

Shirai, Ichiro: *See*—
Yokoi, Gunpei; and Shirai, Ichiro, 4,589,659, Cl. 273-1.0GC.

Shiraishi, Hideo: *See*—
Oda, Hiroyuki; Yokooku, Katsuhiko; Seo, Nobuhide; and Shiraishi, Hideo, 4,589,302, Cl. 74-866.000.

Shiraishi, Yoshiaki; and Aoki, Kenji, to Seiko Epson Corporation. Liquid crystal optical printing apparatus with rod lens. 4,589,732, Cl. 350-331.00R.

Shirakura, Toshiharu: *See*—
Kawakubo, Yukio; Sugawara, Hiroyuki; Kuwabara, Kouji; Shirakura, Toshiharu; Takemori, Satoshi; and Sasaki, Kouji, 4,590,599, Cl. 372-87.000.

Shirao, Shojiro, to Kabushiki Kaisha Komatsu Seisakusho. Workpiece loading/unloading device for a press or the like. 4,589,819, Cl. 414-752.000.

Shirley, Jon H.: *See*—
Long-sheng, Ma; Hollberg, Leo; Shirley, Jon H.; and Hall, John L., 4,590,597, Cl. 372-32.000.

Shishido, Yoshio: *See*—
Yoshida, Yutaka; Hirayama, Shozo; Kusunoki, Hiroyuki; Shishido, Yoshio; Matsuo, Kazumasa; Mizumoto, Morihide; Kato, Masahiko; and Hagino, Tadao, 4,589,414, Cl. 128-305.000.

Shitara, Tadashi: *See*—
Mizoguchi, Hiroaki; Hayashibara, Toshio; Shitara, Tadashi; Katano, Sigeyuki; and Kume, Hideo, 4,589,827, Cl. 417-423.00R.

Shore Plastics, Inc.: *See*—
Sussman, Morris, 4,589,430, Cl. 132-82.00D.

Showalter, Merle R., to Automotive Engine Associates. Squeeze film rocker tip. 4,589,383, Cl. 123-90.360.

Shukla, Vishwa; Padovani, Francois A.; and Cooper, Lawrence, to Texas Instruments Incorporated. Piezoelectric cylinder pressure transmitter. 4,590,400, Cl. 310-338.000.

Sidoti, Daniel R.; Dokos, John H.; Katz, Edward; and Moscowitz, Charles M., to Anheuser-Busch Incorporated. Flavor enhancement and potentiation with beer concentrate. 4,590,085, Cl. 426-582.000.

Sieber, Albrecht; and Wawretzko, Joachim, to Robert Bosch GmbH. Controlling device for the start of injection in an internal combustion engine operating with self-ignition. 4,589,391, Cl. 123-357.000.

Siebold, Horst: *See*—
Ries, Gunter; and Siebold, Horst, 4,590,452, Cl. 335-301.000.

Siegel, Daniel: *See*—
Cabestany, Jean; Siegel, Daniel; and Righetti, Roland, 4,590,249, Cl. 526-287.000.
Soreau, Michel; and Siegel, Daniel, 4,590,228, Cl. 523-131.000.

Siemens Aktiengesellschaft: *See*—
Ahne, Hellmut; Kleeberg, Wolfgang; Rubner, Roland; and Kruger, Hans, 4,590,103, Cl. 427-387.000.
Breimesser, Fritz; Hassler, Dietrich; Hundt, Eckart; Maderlechner, Gerd; and Trautenberg, Elmar, 4,589,284, Cl. 73-626.000.
Hacker, Heinz; Ihlein, Walter; Laupenmuhlen, Heinz-Klaus; and Mertens, Willi, 4,590,256, Cl. 528-93.000.
Kunze, Dieter, 4,590,328, Cl. 174-88.00R.
Manz, Hermann; and Schweiger, Walter, 4,589,162, Cl. 16-115.000.
Mathyssek, Konrad; and Keil, Rudolf, 4,589,897, Cl. 65-2.000.
Ries, Gunter; and Siebold, Horst, 4,590,452, Cl. 335-301.000.
Winzer, Gerhard, 4,589,724, Cl. 350-96.150.
Winzer, Gerhard, 4,590,619, Cl. 455-612.000.

Siemens Gammasonics, Inc.: *See*—
Platz, Winfried, 4,590,378, Cl. 250-363.00S.

Siemers, Paul A.; and Krystyniak, Casimir W., to General Electric Company. Method for making interdiffused, substantially spherical ceramic powders. 4,590,090, Cl. 427-34.000.

Sietmann, Vernon H.: *See*—
Brockhaus, Donald B.; Fuehrer, Calvin L.; Swartz, Walter E.; and Sietmann, Vernon H., 4,589,332, Cl. 98-55.000.

Sigma-Tau Industrie Farmaceutiche Riunite S.p.A.: *See*—
Cavazza, Claudio; De Witt, Paolo; Tinti, Maria O.; and Quaresima, Emma, 4,590,209, Cl. 514-547.000.

Sigri GmbH: *See*—
Etzel, Karl W. F., 4,589,967, Cl. 204-243.00R.

Sih, John C.: *See*—
Aristoff, Paul A.; and Sih, John C., 4,590,297, Cl. 568-374.000.

Sikina, Thomas V., Jr.: *See*—
Nikolayuk, Nicholas; and Sikina, Thomas V., Jr., 4,590,480, Cl. 343-771.000.

Silver River Electronic Co., Ltd.: *See*—
Chen, Grand, 4,590,543, Cl. 362-183.000.

Silver Seiko Ltd.: *See*—
Ozawa, Hideaki; Hoshino, Seiji; and Nagashima, Yoshimitu, 4,589,646, Cl. 271-4.000.

Silverberg, Morton, to Xerox Corporation. Vacuum document feeder. 4,589,651, Cl. 271-245.000.

Silverberg, Morton, to Xerox Corporation. Plural level vacuum document feeder. 4,589,652, Cl. 271-245.000.

Simmons, Ralph L.: *See*—
Pottier, Alain P.; Walulik, James J.; and Simmons, Ralph L., 4,589,717, Cl. 339-94.00M.

Simone, Michelle: *See*—
Villamagna, Andrew C.; and Simone, Michelle, 4,589,331, Cl. 98-39.100.

Simonutti, Mario D.: *See*—
Hsu, Ting-Ih; and Simonutti, Mario D., 4,590,446, Cl. 333-125.000.

Simpson, John P.: *See*—
Aujla, Sharanjit S.; Middlehurst, Richard J.; and Simpson, John P., 4,589,720, Cl. 339-147.00R.

Simpson, Neil A. A., to Diamant Boart Societe Anonyme. Well bore enlarger. 4,589,504, Cl. 175-267.000.

Singer, Wayne J., to Kimberly-Clark Corporation. Surgical face mask and hood. 4,589,408, Cl. 128-132.00R.

Sinha, Ashok K.: *See*—
Dalton, John V.; Orlowsky, Kenneth J.; and Sinha, Ashok K., 4,589,928, Cl. 148-1.500.

Sintra-Alcatel: *See*—
Leroy, Claude; and Parent, Guy, 4,590,591, Cl. 367-6.000.

Sites S.p.A.: *See*—
Teppa, Roberto, 4,589,218, Cl. 42-50.000.

Sivilich, Daniel M., to E. R. Squibb & Sons, Inc. Male incontinence device. 4,589,877, Cl. 604-385.00R.

Sjostrand, Uno; and Andersson, Sven, to Tetra Pak International AB. Joint on packing containers and a method and arrangement for the manufacture of the same. 4,589,591, Cl. 229-48.0SA.

SKF Kugellagerfabriken GmbH: *See—*
Brandenstein, Manfred; Haas, Roland; Herrmann, Gerhard; Dobhan, Herbert; and Hans, Rudiger, 4,589,860, Cl. 474-161.000.
Skinner, Wilfred A.: *See—*
Saito, Kenichiro; Heller, Jorge; and Skinner, Wilfred A., 4,590,190, Cl. 514-221.000.
Skobelkin, Oleg X.: *See—*
Malyshev, Boris N.; Saljuk, Viktor A.; Skobelkin, Oleg X.; Brekhov, Evgeny I.; Smirnov, Boris A.; Korolkov, Ivan A.; Bashilov, Viktor P.; and Ivanova, Tatyana L., 4,589,413, Cl. 128-305.000.
Skonezny, Paul M.: *See—*
Daluge, Susan M.; Skonezny, Paul M.; Roth, Barbara; and Rauckman, Barbara S., 4,590,271, Cl. 544-324.000.
Slaifer, Sigismund: *See—*
Apetrei, Constantin; Slaifer, Sigismund; Vatafu-Gaitan, Laurentiu; Stefanescu, Dumitru; Marinescu, Stelian; and Catana, Marin, 4,589,534, Cl. 192-18.00B.
Slimp, Jack B., Jr. Tiltable board game apparatus. 4,589,664, Cl. 273-258.000.
Sliz, Jan: *See—*
Barton, Piotr; Krzystolik, Pawel; Sliz, Jan; Dworok, Roman; Lebecki, Kazimierz; and Slotwinski, Ryszard, 4,590,373, Cl. 250-308.000.
Slotwinski, Ryszard: *See—*
Barton, Piotr; Krzystolik, Pawel; Sliz, Jan; Dworok, Roman; Lebecki, Kazimierz; and Slotwinski, Ryszard, 4,590,373, Cl. 250-308.000.
SMID S.A.: *See—*
Erhard, Raymond, 4,589,641, Cl. 269-289.00R.
Smirnov, Boris A.: *See—*
Malyshev, Boris N.; Saljuk, Viktor A.; Skobelkin, Oleg X.; Brekhov, Evgeny I.; Smirnov, Boris A.; Korolkov, Ivan A.; Bashilov, Viktor P.; and Ivanova, Tatyana L., 4,589,413, Cl. 128-305.000.
Smith, Billie D. Nested balloon holder. 4,589,854, Cl. 446-223.000.
Smith, Charles M.: *See—*
Holabeck, Gus D.; Mullen, William A.; Smith, Charles M.; and Hawthorne, V. Terrey, 4,589,348, Cl. 105-228.000.
Smith, Clifford J., to University of Toledo, The. Dispensing system having weight dependent control means. 4,589,372, Cl. 119-51.00R.
Smith, David E. Firing lock with safety system for self loading fire arms. 4,589,327, Cl. 89-148.000.
Smith, David W.; and Yevich, Joseph P., to Bristol-Myers Company. Analgesic 1,2-benzisothiazol-3-ylpiperazine derivatives. 4,590,196, Cl. 514-253.000.
Smith, James R.: *See—*
Christiansen, Robert A.; Rose, Frank M., Jr.; Smith, James R.; and Woosley, Kenneth D., 4,589,584, Cl. 228-110.000.
Smith, Larry D. Jack locking mechanism. 4,589,632, Cl. 254-418.000.
Smith, Nathan R., to InTest Corporation. Electronic test head positioner for test systems. 4,589,815, Cl. 414-590.000.
Smith, Norvel L.: *See—*
Inoue, Seizaburo; and Smith, Norvel L., 4,589,834, Cl. 425-369.000.
Smith, Paul Reed: *See—*
Pritchard, Eric K., 4,589,321, Cl. 84-297.00R.
Smith, Richard A.: *See—*
Kendall, William F.; Smith, Richard A.; and Wadsworth, William, 4,589,240, Cl. 52-309.110.
Smith, Roger, Jr.: *See—*
Johnson, Horace A.; and Smith, Roger, Jr., 4,589,503, Cl. 175-113.000.
Smith, Tennyson, to Photo Acoustic Technology, Inc. Apparatus and technique for monitoring photoelectron emission from surfaces. 4,590,376, Cl. 250-358.100.
Smith, Thomas M. Infra-red irradiation. 4,589,843, Cl. 432-59.000.
Smollin, Charles F., to RCA Corporation. Digital control of color in CRT display. 4,590,463, Cl. 340-703.000.
Societe Alsacienne de Construction de Material Textile: *See—*
Moessinger, Albert; and Angebault, Joel, 4,589,451, Cl. 139-452.000.
Societe Cortial, S.A.: *See—*
Creuzet, Marie-Helene; Feniou, Claude; Guichard, Francoise; Prat, Gisele; and Pontagnier, Henri, 4,590,193, Cl. 514-253.000.
Societe Francaise Hoechst: *See—*
Cabestany, Jean; Siegel, Daniel; and Righetti, Roland, 4,590,249, Cl. 526-287.000.
Soreau, Michel; and Siegel, Daniel, 4,590,228, Cl. 523-131.000.
Societe Nationale Industrielle Aerospatiale: *See—*
Caye, Paul D.; Jamain, Patrice C.; and Weisser, Bernard G., 4,589,707, Cl. 308-10.000.
Soderbaum, Ulf, to AB Volvo Penta. Boat propeller drive unit. 4,589,850, Cl. 440-61.000.
Sofi, Sergio: *See—*
Valle, Franco; and Sofi, Sergio, 4,589,784, Cl. 400-56.000.
Soft Sheen Products, Inc.: *See—*
Bernstein, Joel E., 4,590,212, Cl. 514-629.000.
Solavolt International: *See—*
Lesk, Israel A.; Rice, M. John, Jr.; and Sarma, Kalluri R., 4,590,024, Cl. 264-81.000.
Soler, Francis C. Mixing apparatus. 4,589,777, Cl. 366-160.000.
Solo Cup Company: *See—*
Clements, Jack D., 4,589,569, Cl. 220-380.000.
Soltau, Martin: *See—*
Pronk, Jacobus N.; Soltau, Martin; and Wieske, Theophil, 4,590,087, Cl. 426-603.000.
Sony Corporation: *See—*
Saito, Etsuro, 4,590,532, Cl. 360-133.000.
Takemoto, Sohei; and Nakamura, Masato, 4,590,522, Cl. 358-321.000.
Sorbo, Peter J.: *See—*
Kimball, John J.; Kirk, Harry V.; Roule, Richard L.; Sennett, Richard C.; and Sorbo, Peter J., 4,589,943, Cl. 156-256.000.
Soreau, Michel; and Siegel, Daniel, to Societe Francaise Hoechst. Injection composition for filling or reinforcing grounds. 4,590,228, Cl. 523-131.000.
Soto Curiel, Carlos D.: *See—*
Sanchez Aguilar, Ricardo B.; Mendez, Francisco R.; Equihua Zamora, Luis F.; and Soto Curiel, Carlos D., 4,589,445, Cl. 137-616.700.
Southard, George L., to Vipont Laboratories, Inc. Antimicrobial plaque disclosing agent. 4,590,061, Cl. 424-7.100.
Southern Research Institute: *See—*
Dunn, Richard L.; Terry, Richard N.; Cowsar, Donald R.; and Casper, Robert A., 4,589,880, Cl. 604-892.000.
Spacelabs Inc.: *See—*
Adams, Isabelle M.; Carlson, James M.; Rooks, James B.; and Yeshaya, Amalia, 4,589,420, Cl. 128-702.000.
Spaleck, Walter: *See—*
Morguet, Hermann; Hobes, John; Spaleck, Walter; and Payer, Wolfgang, 4,590,247, Cl. 526-124.000.
Spanjer, Keith G.: *See—*
Du Bois, Jerry M.; and Spanjer, Keith G., 4,589,195, Cl. 29-588.000.
Sparacio, Dorinda A.: *See—*
Piechota, Stanley E., Jr.; and Sparacio, Dorinda A., 4,590,065, Cl. 424-49.000.
Sparks, Colin R.: *See—*
Hilditch, Edward A.; Hambling, Robert E.; Sparks, Colin R.; and Walker, David A., 4,590,208, Cl. 514-500.000.
Sparrow, David J.: *See—*
Brown, James P.; Carroll, William G.; May, Ronald N.; Merckx, Erik M. B.; and Sparrow, David J., 4,590,226, Cl. 521-174.000.
Spector, George: *See—*
Boutto, Uuno J.; and Spector, George, 4,589,259, Cl. 60-698.000.
Loth, Andrew; and Spector, George, 4,589,207, Cl. 30-287.000.
Speizman Industries, Inc.: *See—*
Barbee, Jack C., 4,589,267, Cl. 66-12.000.
Spencer, Paul R.: *See—*
Hay, Robert R.; and Spencer, Paul R., 4,590,482, Cl. 346-1.100.
Spencer, Peter. Method and apparatus for the removal of noxious acidic gases from a hot exhaust gas stream. 4,589,889, Cl. 55-48.000.
Sperber, Franz: *See—*
Wackerle, Peter; Schulz, Ralf-Thilo; Sperber, Franz; Koletzko, Wolfram; and Prochaska, Wolfgang, 4,589,679, Cl. 280-777.000.
Sperry Corporation: *See—*
Gershenson, Meir, 4,589,961, Cl. 204-15.000.
Kraemer, Erich H., 4,590,617, Cl. 455-328.000.
Lutes, Charles L., 4,590,426, Cl. 324-248.000.
Ransom, Stephen A.; and Stickel, Tedd K., 4,590,393, Cl. 307-471.000.
Zenk, Daniel K.; and Michaelson, Wayne A., 4,590,586, Cl. 364-900.000.
Zweifel, Terry L., 4,589,616, Cl. 244-180.000.
Spielau, Paul: *See—*
Kuhnel, Werner; and Spielau, Paul, 4,590,221, Cl. 521-85.000.
Spielmann, Werner; and Schaeffer, Georg, to Hoechst Aktiengesellschaft. Process for the manufacture of p-hydroxyphenyl-acetic acid. 4,590,295, Cl. 562-478.000.
Spinnbau GmbH: *See—*
Bernhardt, Siegfried, 4,589,167, Cl. 19-106.00R.
Spitler, Lynn E.: *See—*
Scannon, Patrick J.; Spitler, Lynn E.; Lee, Howard M.; Kawahata, Russell T.; and Mischak, Ronald P., 4,590,071, Cl. 424-85.000.
Spitz, Albert W., to Milpat Corporation. Removal of sulfur oxides from gas streams with ammonium sulfite. 4,590,048, Cl. 423-242.000.
Spivey, Bruce T. Portable liquid storage tank. 4,589,565, Cl. 220-71.000.
Sprague Electric Company: *See—*
Dumery, Stefaan D., 4,589,282, Cl. 73-313.000.
Sprecher & Schuh AG: *See—*
Blum, Alex, 4,590,450, Cl. 335-129.000.
Springfast Limited: *See—*
Ponting, Michael A. F., 4,589,170, Cl. 24-456.000.
Spurrell, Robert M.: *See—*
Adams, Terry N.; Spurrell, Robert M.; Karsner, Grant G.; Golike, Gregory P.; and Lincoln, James F. L., 4,589,356, Cl. 110-347.000.
Lincoln, James F. L.; Buder, Manfred K.; Brown, Craig A.; Golike, Gregory P.; and Spurrell, Robert M., 4,589,357, Cl. 110-347.000.
SRI International: *See—*
Sanjurjo, Angel, 4,590,043, Cl. 422-189.000.
Stachura, Joseph F.: *See—*
Burgit, Richard A.; Davis, Newton G.; Goyert, Josita M.; Johnson, Keith, Jr.; Long, Robert A.; and Stachura, Joseph F., 4,589,200, Cl. 29-753.000.
Staffeld, Stanley E. Insertion tool. 4,589,178, Cl. 29-240.000.
Stager, Daniel J. Welding rod package. 4,589,550, Cl. 206-443.000.
Stahl, Werner. Decanter-type centrifuge. 4,589,866, Cl. 494-54.000.
Stancil Textile Co., Inc.: *See—*
Oakley, C. Mitchell, Jr.; and Chatman, William L., 4,589,266, Cl. 66-12.000.
Standard-Knapp, Inc.: *See—*
Kroeber, Kenneth E.; and Kayser, H. Steven, 4,589,245, Cl. 53-248.000.
Standard Oil Company, The: *See—*
Wu, Mu-Yen M.; and Ball, Lawrence E., 4,590,251, Cl. 526-311.000.

Standard Oil Company (Indiana): *See*—
Schroder, Michael L., 4,589,700, Cl. 299-18.000.

Stankewitsch, Leo, to Motoren-Werke Mannheim Aktiengesellschaft vorm, Benz Abt, stationarer Motorenbau. Apparatus for adapting to gases of different calorific values in the supply of gas-air mixture to gas engines. 4,589,397, Cl. 123-590.000.

Stark, Paul, to Eli Lilly and Company. Anti-anxiety method. 4,590,213, Cl. 514-653.000.

Starnes, Dennis L.; Kimball, William G.; and Keziah, David K., to Cannon Mills Company. Apparatus and method for automatically guiding, trimming, splitting and side hemming continuous textile material. 4,589,361, Cl. 112-262.300.

State of South Australia: *See*—
O'Sullivan, Brendan W.; Leggett, Leo J.; and Melvin, Maxwell V., 4,589,370, Cl. 119-4.000.

Staub, Samuel, to Ferag AG. Apparatus for winding up printed products arriving in imbricated formation. 4,589,606, Cl. 242-76.000.

Staudinger, Gernot. Method for dry desulfurization of exhaust gas. 4,590,049, Cl. 423-244.000.

Stauffer Chemical Company: *See*—
Felix, Raymond A., 4,589,907, Cl. 71-86.000.

Stavola, Michael J.: *See*—
Capasso, Federico; Gossard, Arthur C.; and Stavola, Michael J., 4,590,507, Cl. 357-28.000.

Steadman, Stephen T., to Boeing Company, The. Cargo drive unit. 4,589,542, Cl. 198-782.000.

Stefanescu, Dumitru: *See*—
Apetrei, Constantin; Slaifer, Sigismund; Vatafu-Gaitan, Laurentiu; Stefanescu, Dumitru; Marinescu, Stelian; and Catana, Marin, 4,589,534, Cl. 192-18.00B.

Stein Industrie: *See*—
Franzolini, Marc; and Marjollet, Jacques, 4,589,893, Cl. 55-269.000.

Stein, W. Fred: *See*—
Weatherby, Robert G.; and Stein, W. Fred, 4,589,163, Cl. 16-124.000.

Steinberg, Eckard, to Kraftwerk Union Aktiengesellschaft. Method for treating the surface of finished parts, particularly the surface of tubes and spacers formed of zirconium alloys, for nuclear reactor fuel assemblies. 4,589,929, Cl. 148-6.300.

Steinberg, Robert M.: *See*—
McGuire, Thomas L.; and Steinberg, Robert M., 4,589,590, Cl. 229-92.800.

Steiner, Pirmin: *See*—
Muller, Kurt; Kalt, Paul; Steiner, Pirmin; and Hurlemann, Ernst, 4,589,325, Cl. 89-33.020.

Steingass, Robert W., to Task Force Tips Incorporated. Fire apparatus valve. 4,589,439, Cl. 137-219.000.

Stemmle, Denis J., to Xerox Corporation. Cantilevered sorter. 4,589,653, Cl. 271-293.000.

Stensaas, Larry J. Plant fertilization using a microbiological system for phosphorus extraction and distribution. 4,589,225, Cl. 47-58.000.

Stensaas, Larry J. Microbiological systems for phosphate extraction and distribution to plant root systems. 4,589,226, Cl. 47-58.000.

Sterling Drug Inc.: *See*—
Bailey, Denis M., 4,590,183, Cl. 514-163.000.
Lesher, George Y.; and Dickinson, William B., 4,590,194, Cl. 514-247.000.

Stevanovich, Illia M.: *See*—
Lachiw, Ark; and Stevanovich, Illia M., 4,589,228, Cl. 49-386.000.

Stevens, Grady E., to International Paper Company. Aerial burning and fire control unit for a helicopter. 4,589,614, Cl. 244-136.000.

Stevenson, John S.: *See*—
Woldy, Paul N.; Stevenson, John S.; and Preston, William E., 4,590,326, Cl. 136-233.000.

Stewart, Peter W.: *See*—
Seltzer, Raymond; Patel, Ambelal R.; Stewart, Peter W.; and White, Charlene, 4,590,231, Cl. 524-100.000.

Stewart, Timothy C.; Ofman, Leo; Blair, Kelvin R.; and Gregg, Randolph M., to Motorola Inc. Carrier for stacked semiconductor die. 4,589,547, Cl. 206-328.000.

Stickel, Tedd K.: *See*—
Ransom, Stephen A.; and Stickel, Tedd K., 4,590,393, Cl. 307-471.000.

Stiegler, Gerd: *See*—
Zarges, Frank W.; and Stiegler, Gerd, 4,589,209, Cl. 30-478.000.

Stieglitz, Mark, to Western Digital Corporation. Token access controller protocol and architecture. 4,590,468, Cl. 340-825.500.

Stierlen-Maquet AG: *See*—
Schnelle, Eberhard; Jung, Hans-Ulrich; Mussler, Rudiger; and Pfeuffer, Reinhard, 4,589,642, Cl. 269-325.000.

Stitz, Walter L., to Bethlehem Steel Corporation. Method of quenching hot strip mill product. 4,589,933, Cl. 148-143.000.

Stjernholm, Rune L. Platinum bound to transferrin for use in the treatment of breast tumors. 4,590,001, Cl. 530-394.000.

Stol, Israel, to Unimation, Inc. Apparatus for electrically isolated hot wire surfacing processes. 4,590,358, Cl. 219-136.000.

Stone, Frederick A.; and Maron, Robert J., to Teleco Oilfield Services Inc. Method of manufacturing an insulating coupling for drill collars. 4,589,187, Cl. 29-458.000.

Storey, Moorfield, Jr.: *See*—
Jones, Philip; Jones, William R.; and Storey, Moorfield, Jr., 4,589,770, Cl. 356-1.000.

Stormor, Inc.: *See*—
Brockhaus, Donald B.; Fuehrer, Calvin L.; Swartz, Walter E.; and Sietmann, Vernon H., 4,589,332, Cl. 98-55.000.

Streeter, Bruce E.; MacMillan, John H.; and Bertozzi, Eugene R., to Morton Thiokol, Inc. Thioether-modified sealant compositions. 4,590,240, Cl. 525-123.000.

Streibel, Adolf. Toothbrush. 4,589,159, Cl. 15-167.00R.

Strikis, Guntis V.; and Bekheet, Zaki C., to Ford Motor Company. Electromagnetic friction clutch. 4,589,536, Cl. 192-35.000.

Stringer, Leonard C. Method of applying a male incontinence device. 4,589,875, Cl. 604-351.000.

Stringfellow, William D.: *See*—
Langer, Friedrich H.; and Stringfellow, William D., 4,589,495, Cl. 166-383.000.

Strnad, Albert R.: *See*—
Bridges, Thomas J.; and Strnad, Albert R., 4,589,729, Cl. 350-96.320.

Strobel, Joseph R., to Eastman Kodak Company. Camera viewfinder. 4,589,749, Cl. 354-221.000.

Strohbeen, John. Multidriver loudspeaker. 4,590,333, Cl. 179-115.5PS.

Stumpp, Gerhard; Hofmann, Karl; Treiber, Jurgen; and Wellein, Horst, to Robert Bosch GmbH. Nozzle for internal combustion engines. 4,589,596, Cl. 239-397.500.

Suchy, Jan B.: *See*—
Bennett, Everett W.; and Suchy, Jan B., 4,590,006, Cl. 260-393.000.

Sue, Julia M.: *See*—
Sytkowski, Arthur J.; and Sue, Julia M., 4,590,168, Cl. 436-518.000.

Sugawara, Hiroyuki: *See*—
Kawakubo, Yukio; Sugawara, Hiroyuki; Kuwabara, Kouji; Shirakura, Toshiharu; Takemori, Satoshi; and Sasaki, Kouji, 4,590,599, Cl. 372-87.000.

Sugihara, Isao; and Ikegami, Tsukasa, to Hitachi, Ltd. Method of heating piping arrangement and heating coil. 4,590,346, Cl. 219-10.430.

Sugio, Akitoshi; Masu, Masanobu; Amagai, Akikazu; and Kobayashi, Toshihiko, to Mitsubishi Gas Chemical Company, Inc. Polyphenylene ether resin composition suitable for electroless plating. 4,590,239, Cl. 525-92.000.

Sugitani, Yuji: *See*—
Nomura, Hirokazu; Sugitani, Yuji; and Tamaoki, Naohiro, 4,590,355, Cl. 219-125.120.

Sugiura, Haruyuki; Hayashi, Yoshitoki; and Matsui, Kazuhiro, to Kitagawa Industries Co., Ltd. Securing unit. 4,589,794, Cl. 403-187.000.

Sugiyama, Hiroshi; Hosoda, Keizo; Okada, Masanori; Iwane, Yoshitaka; and Murakami, Yasushi, to Chugai Seiyaku Kabushiki Kaisha. Fungicidal isonicotinanllide retals, their compositions and method of using them. 4,590,198, Cl. 514-336.000.

Sugiyama, Jun; Nonomura, Yutaka; Tsukada, Kouji; Shimaoka, Keiichi; Takeuchi, Masaharu; and Takeuchi, Takashi, to Kabushiki Kaisha Toyota Chuo Kenkyusho. Torque sensor. 4,589,290, Cl. 73-862.360.

Suling, Carlhans: *See*—
Konig, Joachim; Suling, Carlhans; and Lindner, Christian, 4,590,236, Cl. 524-460.000.

Sullivan, Michael J., to Astro-Med, Inc. Circuit for controlling energization of thermal print head. 4,590,488, Cl. 346-76.0PH.

Sulzer Brothers Limited: *See*—
Eisenlohr, Franz, 4,589,450, Cl. 139-54.000.
Grotloh, Karlheinz, 4,589,627, Cl. 251-25.000.

Sumitomo Chemical Company, Limited: *See*—
Hashimoto, Tadanori; Nakano, Kazuhiko; Hama, Masaaki; and Matsuda, Norio, 4,590,053, Cl. 423-344.000.
Hashimoto, Tadanori; Nakano, Kazuhiko; and Matsuda, Norio, 4,590,127, Cl. 428-405.000.

SUN-S Company Ltd.: *See*—
Miyamoto, Motomu, 4,590,451, Cl. 335-161.000.

Sunaga, Yasumasa: *See*—
Doi, Yoshikazu; Suzuki, Masane; and Sunaga, Yasumasa, 4,589,723, Cl. 350-3.830.

Sunderland, Francis S. Fishing lure storage and transportation structure. 4,589,546, Cl. 206-315.110.

Sundstrand Corporation: *See*—
Davis, Randall D., 4,590,397, Cl. 310-71.000.
Laycock, John E., 4,589,524, Cl. 184-103.100.

Sussman, Morris, to Shore Plastics, Inc. Cosmetic kit with replaceable holders. 4,589,430, Cl. 132-82.00D.

Suter, Franz: *See*—
Masek, Jaroslav; and Suter, Franz, 4,589,444, Cl. 137-613.000.

Suzuki, Hiroshi, to Tachikawa Spring Co., Ltd. Head-rest device for a vehicle seat. 4,589,698, Cl. 297-410.000.

Suzuki, Keitaro: *See*—
Watanabe, Yoshitane; Suzuki, Keitaro; and Teranishi, Masayuki, 4,589,997, Cl. 252-313.100.

Suzuki, Masane: *See*—
Doi, Yoshikazu; Suzuki, Masane; and Sunaga, Yasumasa, 4,589,723, Cl. 350-3.830.

Suzuki, Masaru, to Kabushiki Kaisha Tokai Rika Denki Seisakusho. Switch for adjustably tilting mirror members of outer members. 4,590,338, Cl. 200-5.00R.

Suzuki, Masaru: *See*—
Kawakami, Ken-ichi; Yoshii, Toshiya; Suzuki, Masaru; and Okasaka, Hotsuma, 4,590,119, Cl. 428-216.000.

Suzuki, Nobuo: *See*—
Yatabe, Toshiaki; Suzuki, Nobuo; and Itakura, Yoshio, 4,590,118, Cl. 428-215.000.

Suzuki, Osamu: *See*—
Oishi, Kengo; and Suzuki, Osamu, 4,589,609, Cl. 242-198.000.

Suzuki, Takehiko: *See—*
Yamazaki, Yasuo; and Suzuki, Takehiko, 4,590,281, Cl. 548-545.000.
Suzuki, Takeshi: *See—*
Iwasaki, Masamitsu; Suzuki, Takeshi; Koizumi, Takashi; Takahashi, Takehiko; Shibata, Kazumasa; Komori, Nobutoshi; and Shimizu, Atsuyoshi, 4,589,215, Cl. 34-182.000.
Svantesson, Ake. Stencil printing machine. 4,589,335, Cl. 101-114.000.
Swanhart, David E., to Trent Box Manufacturing Co., Inc. Collapsible, reusable shipping container. 4,589,588, Cl. 229-41.00R.
Swartz, Walter E.: *See—*
Brockhaus, Donald B.; Fuehrer, Calvin L.; Swartz, Walter E.; and Sietmann, Vernon H., 4,589,332, Cl. 98-55.000.
Sweden Recycling AB: *See—*
Ernryd, Leif, 4,589,442, Cl. 137-546.000.
Sweetin, Willard L. Convertible truck/trailer assembly and method. 4,589,670, Cl. 280-405.00R.
Swiss Aluminium Ltd.: *See—*
Buxmann, Kurt, 4,589,472, Cl. 164-472.000.
Sydkraft AB: *See—*
Edwall, Bengt; and Karlsson, Hans, 4,590,046, Cl. 423-242.000.
Sykes, Willard D. Vending machine dispensing device. 4,589,571, Cl. 221-75.000.
Syntex (U.S.A.) Inc.: *See—*
Prisbe, Ernest J.; and McGee, Daniel P. C., 4,590,269, Cl. 544-276.000.
Ullman, Edwin F., 4,589,421, Cl. 128-763.000.
Systems Research Laboratories, Inc.: *See—*
Mays, Joe A., 4,590,408, Cl. 315-403.000.
Sytkowski, Arthur J.; and Sue, Julia M., to Children's Medical Center Corporation, The. Protein immunoassaying and purification. 4,590,168, Cl. 436-518.000.
Szablikowski, Klaus: *See—*
Luhmann, Erhard; Hoppe, Lutz; and Szablikowski, Klaus, 4,590,019, Cl. 264-3.400.
Szczesny, David S., to AMP Incorporated. Pin shroud with locking clip. 4,589,718, Cl. 339-95.00D.
Szmuszkovicz, Jacob: *See—*
Wallach, Donald P., deceased; Ayer, Donald E.; and Szmuszkovicz, Jacob, 4,590,187, Cl. 514-211.000.
T. T. Boughton & Sons Ltd: *See—*
Boughton, Thomas T., 4,589,671, Cl. 280-433.000.
Tabata, Mitsuo, to Kabushiki Kaisha Toshiba. Method of aligning two members utilizing marks provided thereon. 4,590,382, Cl. 250-491.100.
Tabourier, Remy; and Quintric, Jean M., to Thomson-CSF. Device for generating a frequency modulated signal. 4,590,445, Cl. 332-18.000.
Tabuchi, Jyoichi: *See—*
Itaba, Yasushi; Saito, Keichiro; Tabuchi, Jyoichi; and Yoshizawa, Masao, 4,590,020, Cl. 264-22.000.
Tachikawa Spring Co., Ltd.: *See—*
Isono, Hiroyuki, 4,589,695, Cl. 297-284.000.
Kanai, Shigeru; and Kanai, Masatatsu, 4,589,696, Cl. 297-284.000.
Sakamoto, Takao, 4,589,620, Cl. 248-550.000.
Suzuki, Hiroshi, 4,589,698, Cl. 297-410.000.
Tada, Tetsuya, to Canyon Corporation. Head depression type dispenser. 4,589,573, Cl. 222-153.000.
Tadokoro, Hiroyuki; and Akahori, Kenichi, to Hitachi, Ltd. Laser beam printer control apparatus. 4,589,764, Cl. 355-14.00R.
Tagashira, Minoru: *See—*
Gamo, Takaharu; Moriwaki, Yoshio; Tagashira, Minoru; and Mitsumata, Tadayasu, 4,589,479, Cl. 165-104.120.
Tait, Thomas A.: *See—*
Carver, David; and Tait, Thomas A., 4,589,776, Cl. 356-367.000.
Tajima, Hatsuo: *See—*
Mitsuhashi, Yasuo; Takenouchi, Masanori; Tajima, Hatsuo; Uchiyama, Masaki; Urawa, Motoo; and Okado, Kenji, 4,590,140, Cl. 430-102.000.
Tajima, Tetsuya: *See—*
Tomiuga, Takashi; Nomura, Keiichi; and Tajima, Tetsuya, 4,590,207, Cl. 514-470.000.
Tak, Marinus G. A.: *See—*
Hoeks, Gerardus P. F.; and Tak, Marinus G. A., 4,590,405, Cl. 313-486.000.
Takada, Hiroaki: *See—*
Kume, Satoru; Yoshida, Michiyasu; Konno, Yoshihiro; Kume, Tateo; Takada, Hiroaki; Shinsei, Kiyoichi; Matsumoto, Akio; and Ogawa, Hitoshi, 4,589,254, Cl. 60-286.000.
Takada, Takuzo: *See—*
Hayashi, Yoshiaki; and Takada, Takuzo, 4,589,559, Cl. 215-1.00C.
Takahashi, Hiroshi; Tamaki, Hiroyuki; Ohishi, Chikashi; and Shiba, Keisuke, to Fuji Photo Film Co., Ltd. Process for producing light sensitive lithographic plate requiring no dampening solution. 4,590,148, Cl. 430-303.000.
Takahashi, Naoki, to Kabushiki Kaisha Ishida Koki Seisakusho. Printer with two printing capabilities. 4,589,505, Cl. 177-2.000.
Takahashi, Shozo; Yoshimura, Susumu; and Ozaki, Junji, to Matsushita Electric Industrial Co., Ltd. Organic semiconductor compositions and solid electrolytic capacitor using the same. 4,590,541, Cl. 361-433.000.
Takahashi, Takehiko: *See—*
Iwasaki, Masamitsu; Suzuki, Takeshi; Koizumi, Takashi; Takahashi, Takehiko; Shibata, Kazumasa; Komori, Nobutoshi; and Shimizu, Atsuyoshi, 4,589,215, Cl. 34-182.000.
Takahashi, Takeshi: *See—*
Takahashi, Yasuyuki; Yoshida, Toshiro; and Takahashi, Takeshi, 4,590,086, Cl. 426-602.000.
Takahashi, Toshinori: *See—*
Takanashi, Itsuo; Tanaka, Hideshi; Ohara, Terumi; Kato, Shigeru; Takahashi, Toshinori; Kiuchi, Tsutomu; and Kitamura, Hiroki, 4,590,490, Cl. 346-76.0PH.
Takahashi, Toshio, to Fuji Jukogyo Kabushiki Kaisha. System for diagnosing an internal combustion engine. 4,590,566, Cl. 364-431.110.
Takahashi, Yasuyuki; Yoshida, Toshiro; and Takahashi, Takeshi, to Meiji Milk Products Company Limited. Process for the production of a water-in-oil-in-water emulsion for foods. 4,590,086, Cl. 426-602.000.
Takami, Fumio: *See—*
Nakayama, Yasuhiko; Takami, Fumio; and Shigeno, Masashi, 4,589,747, Cl. 354-149.110.
Takanashi, Itsuo; Tanaka, Hideshi; Ohara, Terumi; Kato, Shigeru; Takahashi, Toshinori; Kiuchi, Tsutomu; and Kitamura, Hiroki, to Victor Company of Japan, Ltd. Thermal transfer color recorder. 4,590,490, Cl. 346-76.0PH.
Takanashi, Nobuyasu: *See—*
Ito, Hideyuki; and Takanashi, Nobuyasu, 4,589,568, Cl. 220-359.000.
Takasago Perfumery Co., Ltd.: *See—*
Yamaguchi, Yuzo; and Sato, Toshiya, 4,590,215, Cl. 514-729.000.
Takasu, Yasuhito; Iwata, Toshiharu; Haraguchi, Hiroshi; and Hosoe, Katsuharu, to Nippondenso Co., Ltd. Ignition timing control for compensating knock in both steady-state and transient state. 4,590,565, Cl. 364-431.080.
Takaya, Takao; Sakane, Kazuo; and Yamanaka, Hideaki, to Fujisawa Pharmaceutical Co., Ltd. Cephem compounds having 3-bicyclic heterocyclic cation groups. 4,590,186, Cl. 514-202.000.
Takayama, Teruo, to Hitachi, Ltd. Intake system for internal combustion engine. 4,589,381, Cl. 123-52.00M.
Takebe, Katsuhiko, to Rhythm Watch Co., Ltd. Means for generating an intermittent alarm sound for a timepiece. 4,589,780, Cl. 368-245.000.
Takeda Chemical Industries, Ltd.: *See—*
Hiraga, Kentaro; and Saji, Yoshiaki, 4,590,189, Cl. 514-212.000.
Nishimori, Katsuhiko; and Nakao, Yukihiro, 4,590,079, Cl. 426-265.000.
Takeda, Mikio; Oh-ishi, Tokuro; Nakajima, Hiromichi; and Nagao, Taku, to Tanabe Seiyaku Co., Ltd. 1,5-benzothiazepine derivatives and their pharmaceutical use. 4,590,188, Cl. 514-211.000.
Takemori, Satoshi: *See—*
Kawakubo, Yukio; Sugawara, Hiroyuki; Kuwabara, Kouji; Shirakura, Toshiharu; Takemori, Satoshi; and Sasaki, Kouji, 4,590,599, Cl. 372-87.000.
Takemori, Shinichi: *See—*
Nakamura, Morio; Obayashi, Shigeji; Takemori, Shinichi; Tanaka, Hitoshi; and Hirakawa, Motomu, 4,590,227, Cl. 523-130.000.
Takemoto, Sohei; and Nakamura, Masato, to Sony Corporation. Apparatus for recording and reproducing a digital information signal with different sampling frequencies. 4,590,522, Cl. 358-321.000.
Takenaka, Fumio: *See—*
Itoh, Masanori; Takenaka, Fumio; and Tohya, Kouzi, 4,590,145, Cl. 430-281.000.
Takenouchi, Masanori: *See—*
Mitsuhashi, Yasuo; Takenouchi, Masanori; Tajima, Hatsuo; Uchiyama, Masaki; Urawa, Motoo; and Okado, Kenji, 4,590,140, Cl. 430-102.000.
Takeuchi, Kazuhiko: *See—*
Nakamura, Kazuharu; and Takeuchi, Kazuhiko, 4,589,842, Cl. 431-301.000.
Takeuchi, Keinosuke, to Hakugen, Ltd. Fragrance releasing sheet article and method of making same. 4,590,111, Cl. 428-67.000.
Takeuchi, Masaharu: *See—*
Sugiyama, Jun; Nonomura, Yutaka; Tsukada, Kouji; Shimaoka, Keiichi; Takeuchi, Masaharu; and Takeuchi, Takashi, 4,589,290, Cl. 73-862.360.
Takeuchi, Masashi: *See—*
Hirai, Hiroyuki; Yabuki, Yoshiharu; Takeuchi, Masashi; and Aono, Toshiaki, 4,590,154, Cl. 430-559.000.
Takeuchi, Ryozo: *See—*
Tsumura, Makoto; and Takeuchi, Ryozo, 4,590,489, Cl. 346-76.0PH.
Takeuchi, Takashi: *See—*
Sugiyama, Jun; Nonomura, Yutaka; Tsukada, Kouji; Shimaoka, Keiichi; Takeuchi, Masaharu; and Takeuchi, Takashi, 4,589,290, Cl. 73-862.360.
Takewaka, Tomoyuki: *See—*
Inoue, Takeshi; Saito, Hiroyuki; Takewaka, Tomoyuki; and Funabashi, Hiroshi, 4,589,516, Cl. 181-256.000.
Takezawa, Isao; and Wakaoka, Shunsuke, to Kabushiki Kaisha Okuma Tekkosho. Automatic measurement/compensation apparatus for tool diameter. 4,590,580, Cl. 364-571.000.
Takimoto, Toshiyuki: *See—*
Mitsuyasu, Masaki; Takimoto, Toshiyuki; and Aoki, Keiji, 4,589,279, Cl. 73-118.000.
Takla, Ashraf K.: *See—*
Haque, Yusuf A.; and Takla, Ashraf K., 4,590,440, Cl. 331-17.000.
Tamada, Kazukiyo: *See—*
Ouchi, Teruo; Tamada, Kazukiyo; and Yamaka, Shiyouichi, 4,589,403, Cl. 128-4.000.
Tamaki, Akira, to Nippon Seiko Kabushiki Kaisha. Means for locating an ultra-precision positioning of a table. 4,590,380, Cl. 250-442.100.

Tamaki, Hiroyuki: *See—*
Takahashi, Hiroshi; Tamaki, Hiroyuki; Ohishi, Chikashi; and Shiba, Keisuke, 4,590,148, Cl. 430-303.000.

Tamaoki, Naohiro: *See—*
Nomura, Hirokazu; Sugitani, Yuji; and Tamaoki, Naohiro, 4,590,355, Cl. 219-125.120.

Tamaru, Kiichiro: *See—*
Yaguchi, Toshiyuki; Kanuma, Akira; and Tamaru, Kiichiro, 4,590,584, Cl. 364-748.000.

Tamasi, Attila; Kardos, Mihaly; and Farago, Laszlo , to "Transinnov" Kozlekedesi Muszaki Fejleszto Leanyvallalat. Method of testing shock absorption of a spring running gear, particularly undercarriage of a road motor vehicle with elastic tires and apparatus for performing the method. 4,589,273, Cl. 73-11.000.

Tamba, Shinichi: *See—*
Fujikawa, Tetsuzo; and Tamba, Shinichi, 4,589,379, Cl. 123-41.490.

Tame, Afif. Method and apparatus for fastener placement on garments. 4,589,212, Cl. 33-190.000.

Tanaami, Shigeyuki; and Yamamoto, Osamu, to NEC Corporation. Voltage controlled diode attenuator. 4,590,417, Cl. 323-229.000.

Tanabe Seiyaku Co., Ltd.: *See—*
Takeda, Mikio; Oh-ishi, Tokuro; Nakajima, Hiromichi; and Nagao, Taku, 4,590,188, Cl. 514-211.000.

Tanahashi, Masao, to Matsushita Electric Works, Ltd. Inner cutter for electric shavers. 4,589,205, Cl. 30-43.800.

Tanaka, Hideshi: *See—*
Takanashi, Itsuo; Tanaka, Hideshi; Ohara, Terumi; Kato, Shigeru; Takahashi, Toshinori; Kiuchi, Tsutomu; and Kitamura, Hiroki, 4,590,490, Cl. 346-76.0PH.

Tanaka, Hitoshi: *See—*
Nakamura, Morio; Obayashi, Shigeji; Takemori, Shinichi; Tanaka, Hitoshi; and Hirakawa, Motomu, 4,590,227, Cl. 523-130.000.

Tanaka, Kazuhiko: *See—*
Ueda, Jitsuhiko; Tomono, Yutaka; and Tanaka, Kazuhiko, 4,590,035, Cl. 420-449.000.

Tanaka, Takashi: *See—*
Ohashi, Ryutaro; Hasegawa, Hisashi; Miyoshi, Masao; Iida, Hajime; Mase, Toshiyuki; Tanaka, Takashi; Funatsu, Tsunemasa; and Nakanishi, Tami, 4,589,261, Cl. 62-73.000.

Tanaka, Tatsuo, to Kabushiki Kaisha Tcshiba. High input impedance differential amplifier. 4,590,435, Cl. 330-258.000.

Tanaka, Togo: *See—*
Yoshizawa, Hideo; Nushi, Masaaki; Sakurai, Kaoru; Usui, Hirotaro; Iida, Naohiro; Tanaka, Togo; and Honjo, Seiichiro, 4,589,901, Cl. 65-107.000.

Tanaka, Toshihiro; Yoshimi, Keiichi; and Goto, Shigeo, to Mitsuboshi Belting Ltd. Method of fabricating double-toothed belts. 4,589,941, Cl. 156-140.000.

Tanaka, Toshinori: *See—*
Hamano, Isao; Morishita, Akira; Akae, Yoshifumi; Tanaka, Toshinori; Matsumoto, Kouichi; Gotou, Takeo; and Yabunaka, Kiyoshi, 4,590,385, Cl. 290-38.00E.

Tanaka, Yoshikazu: *See—*
Abo, Keiju; Kumura, Haruyoshi; Hirano, Hiroyuki; Tanaka, Yoshikazu; Yamamuro, Sigeaki; and Morimoto, Yoshiro, 4,590,561, Cl. 364-424.100.

Tandy Corporation: *See—*
Berger, Michael F.; and Sawyer, Sammy D., 4,590,556, Cl. 364-200.000.

Tang, David Y.: *See—*
Maul, James J.; and Tang, David Y., 4,590,315, Cl. 570-127.000.

Tang, Robert H.; and Crano, John C., to PPG Industries, Inc. Novel organic peroxydicarbonates. 4,590,008, Cl. 558-264.000.

Taniguchi, Takashi; and Mibae, Jiro, to Toray Industries, Inc. Transparent material having antireflective coating. 4,590,117, Cl. 428-212.000.

Taniguchi, Yutaka; and Kato, Hisatoyo, to Fuji Photo Film Co., Ltd. Light-shielding cover for sheet-like light guide member. 4,589,731, Cl. 350-319.000.

Tannery, George F., IV, to RCA Corporation. Bipolar AGC with RF transistor DC bias point stabilization. 4,590,613, Cl. 455-200.000.

Tapfer, David L. Platform service vehicle. 4,589,520, Cl. 182-63.000.

Tapojarvi, Eero. Shelf assembly. 4,589,350, Cl. 108-111.000.

Tasaka, Takeo; Kawaguchi, Akiyoshi; and Tsujikawa, Yozaburo, to Otsuka Kagaku Kabushiki Kaisha. Melt-moldable fluorine-containing resin composition. 4,590,234, Cl. 524-413.000.

Task Force Tips Incorporated: *See—*
Steingass, Robert W., 4,589,439, Cl. 137-219.000.

Taylor, Clarence R. Glove having securing means for improved gripping. 4,589,146, Cl. 2-161.00A.

Taylor, Mark P.: *See—*
Brennan, John J.; Chyung, Kenneth; and Taylor, Mark P., 4,589,900, Cl. 65-33.000.

Tech Trade Corp.: *See—*
Jang, Choong-Gook, 4,590,062, Cl. 424-19.000.

Technica Entwicklungsgesellschaft mbH & Co. KG: *See—*
Kuckens, Alexander; and Korth, Willi, 4,589,326, Cl. 89-145.000.

Teepak, Inc.: *See—*
Bridgeford, Douglas J., 4,590,107, Cl. 428-36.000.

Tegal Corporation: *See—*
Drage, David J., 4,590,042, Cl. 422-186.060.

Teijin Limited: *See—*
Yatabe, Toshiaki; Suzuki, Nobuo; and Itakura, Yoshio, 4,590,118, Cl. 428-215.000.

Teksid S.p.A.: *See—*
Secolo, Nunzio; and Gualchi, Elio, 4,589,177, Cl. 29-159.100.

Tektronix, Inc.: *See—*
Bristol, Lloyd R., 4,590,407, Cl. 315-208.000.

Teleco Oilfield Services Inc.: *See—*
Stone, Frederick A.; and Maron, Robert J., 4,589,187, Cl. 29-458.000.

Telefonaktiebolaget LM Ericsson: *See—*
Jaki, Ivan, 4,590,334, Cl. 179-170.00D.

Telefunken Fernseh und Rundfunk GmbH: *See—*
Platte, Hans-Joachim; Voessing, Walter; Oberjatzas, Gunter; and Schroder, Ernst, 4,590,531, Cl. 360-47.000.

Tennessee Valley Authority: *See—*
Harrison, Cecil P.; and Tittle, Cullen G., 4,589,904, Cl. 71-61.000.

Teppa, Roberto, to Sites S.p.A. Multi-stack cartridge magazine for firearms. 4,589,218, Cl. 42-50.000.

Teranishi, Masayuki: *See—*
Watanabe, Yoshitane; Suzuki, Keitaro; and Teranishi, Masayuki, 4,589,997, Cl. 252-313.100.

Terashima, Kanetsugu: *See—*
Inoue, Hiromichi; Saito, Shinichi; Terashima, Kanetsugu; Inukai, Takashi; and Furukawa, Kenji, 4,589,996, Cl. 252-299.650.

Terauchi, Kiyoshi: *See—*
Sato, Tadashi; Sakamoto, Seiichi; and Terauchi, Kiyoshi, 4,589,828, Cl. 418-55.000.

Terharn, Susanne: *See—*
Buehler, Werner; Mennicke, Stefan; Reiss, Karl; and Terharn, Susanne, 4,590,136, Cl. 429-104.000.

Terlecky, Boris S.: *See—*
Brodeur, Rene H.; and Terlecky, Boris S., 4,589,558, Cl. 213-50.000.

Teron International Urban Corp. Ltd.: *See—*
Teron, William, 4,589,330, Cl. 98-31.000.

Teron, William, to Teron International Urban Corp. Ltd. Ceiling structure. 4,589,330, Cl. 98-31.000.

Terry, Richard N.: *See—*
Dunn, Richard L.; Terry, Richard N.; Cowsar, Donald R.; and Casper, Robert A., 4,589,880, Cl. 604-892.000.

Terumo Corp.: *See—*
Ito, Hideyuki; and Takanashi, Nobuyasu, 4,589,568, Cl. 220-359.000.

Teshima, Kenzo: *See—*
Hatakeyama, Yoshiharu; and Teshima, Kenzo, 4,589,429, Cl. 132-79.00R.

Tetra Pak International AB: *See—*
Andersson, Thorbjorn, 4,590,126, Cl. 428-349.000.
Sjostrand, Uno; and Andersson, Sven, 4,589,591, Cl. 229-48.0SA.

Texaco Inc.: *See—*
Brown, Alfred; Haynes, Stewart; Alves, Gerald W.; and Lim, Frank H., 4,589,486, Cl. 166-252.000.
Woldy, Paul N.; Stevenson, John S.; and Preston, William E., 4,590,326, Cl. 136-233.000.

Texas Instruments Incorporated: *See—*
Anderson, Dirk N., 4,589,196, Cl. 29-591.000.
Guttag, Karl M.; and Nussrallah, Steve, 4,590,552, Cl. 364-200.000.
Maytum, Michael J., 4,590,548, Cl. 363-161.000.
Shukla, Vishwa; Padovani, Francois A.; and Cooper, Lawrence, 4,590,400, Cl. 310-338.000.

Tharp, Gene E.: *See—*
Gin, Vincent M.; and Tharp, Gene E., 4,589,894, Cl. 55-274.000.

Thatcher, Gordon; Ferguson, Barry G.; and Winstanley, John P., to United Kingdom Atomic Energy Authority. Induced current heating probe. 4,590,347, Cl. 219-10.49R.

Thermocatalytic Corp.: *See—*
Farina, Alfred J., 4,589,374, Cl. 122-14.000.

Thetford Corporation: *See—*
Cameron, John T., 4,589,148, Cl. 4-236.000.

Thetford International Products, Ltd.: *See—*
Ellis, Kenneth R., 4,589,832, Cl. 425-289.000.

Tholen, Leo: *See—*
Reiners, Franz-Josef; Knors, Herbert; Tholen, Leo; and Toputt, Heinz-Lorenz, 4,589,602, Cl. 242-35.50R.

Thomas & Betts Corporation: *See—*
Williams, Russell H., 4,589,727, Cl. 350-96.200.

Thomas, Eugene W.: *See—*
Chandley, George D.; and Thomas, Eugene W., 4,589,466, Cl. 164-119.000.

Thomas, Jean M.: *See—*
Gilson, Jacques; Thomas, Jean M.; Prioretti, Guy; and Henry, Pierre, 4,589,633, Cl. 266-44.000.

Thomas, John M.: *See—*
Ballantine, James A.; Gregory, Reginald; Purnell, John H.; Thomas, John M.; and Westlake, David J., 4,590,294, Cl. 560-247.000.

Thomas Julian: *See—*
Eilert, John H.; Levin, Arthur L.; and Thomas Julian, 4,590,550, Cl. 364-200.000.

Thomas, Robert L.; Kuo, Pao-Kuang; and Favro, Lawrence D., to Wayne State University. Thermal wave imaging apparatus. 4,589,783, Cl. 374-45.000.

Thomas, Samuel J.; Robich, James M.; and Hayes, Robert L., to Kendall Company, The. Pipe coating. 4,589,275, Cl. 73-40.50R.

Thomson Components - Mostek Corporation: *See—*
Guterman, Daniel C., 4,590,504, Cl. 357-23.110.

Thomson-CSF: *See—*
Arques, Marc, 4,590,390, Cl. 307-311.000.
Fleury, Georges, 4,590,447, Cl. 333-156.000.
Tabourier, Remy; and Quintric, Jean M., 4,590,445, Cl. 332-18.000.

Thummel, Rudolph C.; and Fory, Werner, to Ciba-Geigy Corporation. N-azidophenylsulfonyl-N'-triazinylureas. 4,589,912, Cl. 71-93.000.

Thurm, Siegfried: *See—*
Fursich, Manfred; Findeis, Gunter; Treiber, Helmut; Fergg, Berthold; and Thurm, Siegfried, 4,589,766, Cl. 355-38.000.

Till, Henry R.: *See—*
Fantuzzo, Joseph; Monkelbaan, Edwin R.; and Till, Henry R., 4,589,759, Cl. 355-8.000.

Timms, Colin T.; and Garrod, James H., to Lucas Industries public limited company. Fuel system for internal combustion engines. 4,589,395, Cl. 123-516.000.

Ting, Patrick L.: *See—*
Cowles, John M.; Goldstein, Henry; Chicoye, Etzer; and Ting, Patrick L., 4,590,296, Cl. 568-366.000.

Tinti, Maria O.: *See—*
Cavazza, Claudio; De Witt, Paolo; Tinti, Maria O.; and Quaresima, Emma, 4,590,209, Cl. 514-547.000.

Tipton, James: *See—*
Burrage, Robert G.; Glaze, Stanley G.; and Tipton, James, 4,590,549, Cl. 364-131.000.

Titcomb, Stanley T.; and Juers, Arthur A., to Ralston Purina Company. Reduced calorie, high fiber content breads and methods of making same. 4,590,076, Cl. 426-62.000.

Tittle, Cullen G.: *See—*
Harrison, Cecil P.; and Tittle, Cullen G., 4,589,904, Cl. 71-61.000.

TMC Corporation: *See—*
Krob, Erwin; and Bauer, Helmut, 4,589,674, Cl. 280-633.000.

Toa Nenryo Kogyo Kabushiki Kaisha: *See—*
Imai, Masafumi; Yamamoto, Tadashi; Furuhashi, Hiroyuki; Ueno, Hiroshi; and Inaba, Naomi, 4,590,325, Cl. 585-512.000.
Itaba, Yasushi; Saito, Keichiro; Tabuchi, Jyoichi; and Yoshizawa, Masao, 4,590,020, Cl. 264-22.000.
Izumi, Takayuki, 4,589,974, Cl. 208-22.000.

Toda, Takao: *See—*
Yanagi, Masaaki; Ono, Satoshi; Toda, Takao; Kashiwagi, Kazuo; Endo, Makoto; and Saito, Yoshihiro, 4,589,767, Cl. 355-45.000.

Todaro, George J.: *See—*
Twardzik, Daniel R.; and Todaro, George J., 4,590,003, Cl. 530-330.000.

Todt, William H.: *See—*
Goldstein, Norman P.; Service, Alex D.; and Todt, William H., 4,590,401, Cl. 313-93.000.

Toganoh, Shigeo: *See—*
Ichihashi, Hiroo; Toganoh, Shigeo; and Matsufuji, Yohji, 4,590,494, Cl. 346-140.00R.

Tohya, Kouzi: *See—*
Itoh, Masanori; Takenaka, Fumio; and Tohya, Kouzi, 4,590,145, Cl. 430-281.000.

Toki, Tadaaki: *See—*
Haga, Takahiro; Toki, Tadaaki; Koyanagi, Toru; Okada, Hiroshi; Yoshida, Kiyomitsu; and Imai, Osamu, 4,590,182, Cl. 514-80.000.

Tokushima, Takashige; Okitsu, Kingo; Mochizuki, Yoshiyuki; and Tsuji, Kouji, to Mazda Motor Corporation. Supercharger control in automobile engine system. 4,589,396, Cl. 123-559.000.

Tokyo Electric Co., Ltd.: *See—*
Sato, Masafumi, 4,589,785, Cl. 400-61.000.

Tokyo Juki Industrial Co., Ltd.: *See—*
Yasui, Hideo, 4,589,360, Cl. 112-121.110.

Tokyo Kogaku Kikai Kabushiki Kaisha: *See—*
Kimura, Akio; and Horihawa, Yoshio, 4,589,744, Cl. 350-566.000.

Tokyo Ohka Kogyo Co., Ltd.: *See—*
Nakane, Hisashi; Yokota, Akira; Yabuta, Mitsuo; Tsuda, Minoru; and Ishii, Wataru, 4,590,149, Cl. 430-325.000.

Tokyo Shibaura Denki Kabushiki Kaisha: *See—*
Akiba, Masashi; Minagawa, Ryuji; and Mori, Sumio, 4,589,256, Cl. 60-660.000.
Baldwin, David R.; and Hodgkiss, Douglas H., 4,590,559, Cl. 364-414.000.
Iimori, Akiro, 4,589,760, Cl. 355-8.000.
Koike, Hideharu, 4,590,396, Cl. 307-572.000.
Komatsu, Shigeru, 4,589,936, Cl. 148-188.000.
Komori, Yuji, 4,590,525, Cl. 360-66.000.
Nakagome, Hideki; and Yasuda, Satoshi, 4,589,953, Cl. 156-645.000.
Noda, Makoto, 4,590,553, Cl. 364-200.000.
Umemura, Yoshiyuki, 4,590,582, Cl. 364-724.000.
Yaguchi, Toshiyuki; Kanuma, Akira; and Tamaru, Kiichiro, 4,590,584, Cl. 364-748.000.

Tomita, Masami: *See—*
Aoki, Mitsuo; Inoue, Satoru; Yamaguchi, Kimitoshi; Uchida, Mitsuru; Tomita, Masami; and Uematsu, Chiaki, 4,590,141, Cl. 430-108.000.

Tomita, Masao: *See—*
Honjo, Masahiro; Tomita, Masao; and Kobayashi, Masaaki, 4,590,523, Cl. 360-10.300.

Tomita, Minoru, to Komori Printing Machinery Co., Ltd. Varnish coater for printed product. 4,589,368, Cl. 118-258.000.

Tomiuga, Takashi; Nomura, Keiichi; and Tajima, Tetsuya, to Eisai Co., Ltd. Therapeutic and/or preventive ophthalmic solution for intraocular hypertension and glaucoma. 4,590,207, Cl. 514-470.000.

Tomono, Yutaka: *See—*
Ueda, Jitsuhiko; Tomono, Yutaka; and Tanaka, Kazuhiko, 4,590,035, Cl. 420-449.000.

Tomori, Yasumasa; Okudaira, Sadao; Aoki, Harumi; Urano, Fumio; and Morisawa, Tahei, to Asahi Kogaku Kogyo Kabushiki Kaisha. Adapter for connecting single-lens reflex camera lens to video camera. 4,589,750, Cl. 354-271.100.

Tomy Kogyo, Co. Inc.: *See—*
Tsuzuki, Akio, 4,589,660, Cl. 273-1.0GA.

Toomey, Joseph E., Jr., to Reilly Tar & Chemical Corp. Filter press electrochemical cell with improved fluid distribution system. 4,589,968, Cl. 204-257.000.

Toone, James R.; and Barker, Robert L., to Magnavox Government and Industrial Electronics Company. Sonobuoy multiple depth deployment apparatus. 4,590,590, Cl. 367-4.000.

Toputt, Heinz-Lorenz: *See—*
Reiners, Franz-Josef; Knors, Herbert; Tholen, Leo; and Toputt, Heinz-Lorenz, 4,589,602, Cl. 242-35.50R.

Toray Industries, Inc.: *See—*
Kawakami, Ken-ichi; Yoshii, Toshiya; Suzuki, Masaru; and Okasaka, Hotsuma, 4,590,119, Cl. 428-216.000.
Taniguchi, Takashi; and Mibae, Jiro, 4,590,117, Cl. 428-212.000.

Torti, Mario; and Capdeboscq, Bernard, to S. A. Martin. Process and apparatus for producing a strip of corrugated cardboard. 4,589,944, Cl. 156-359.000.

Toshiba Tungaloy Co., Ltd.: *See—*
Hirano, Shin-ichi; and Naka, Shigeharu, 4,590,034, Cl. 419-13.000.

Totten, Arthur B., III. Method and apparatus for installing mine roof supports. 4,589,803, Cl. 405-259.000.

Townsend, Palmer W.; Huang, Chialang; and Vernice, Gerald G., to BOC Group, Inc., The. Process for the preparation of 2,2,2-trifluoroethanol. 4,590,310, Cl. 568-842.000.

Toy, Lester T.: *See—*
Mohebban, Manoochehr; Versteegh, Willem M.; and Toy, Lester T., 4,589,939, Cl. 156-49.000.

Toyo Seikan Kaisha, Ltd.: *See—*
Yazaki, Jinichi; and Tsurumaru, Kazuhiko, 4,590,131, Cl. 428-516.000.

Toyo Soda Manufacturing Co., Ltd.: *See—*
Arai, Shoji; and Hasegawa, Masazumi, 4,590,223, Cl. 521-118.000.

Toyono, Tsutomu; Sakemi, Yuji; and Fujii, Haruo, to Canon Kabushiki Kaisha. Image recording apparatus. 4,590,496, Cl. 346-153.100.

Toyota Jidosha Kabushiki Kaisha: *See—*
Dohnomoto, Tadashi; Kubo, Masahiro; and Kito, Haruo, 4,590,132, Cl. 428-614.000.
Ishikawa, Seiji; and Hirose, Masanori, 4,589,593, Cl. 236-94.000.
Ito, Hiroshi; and Yamada, Shigemichi, 4,589,532, Cl. 192-0.030.
Mitsuyasu, Masaki; Takimoto, Toshiyuki; and Aoki, Keiji, 4,589,279, Cl. 73-118.000.

Toyotomi Kogyo Co., Ltd: *See—*
Nakamura, Kazuharu; and Takeuchi, Kazuhiko, 4,589,842, Cl. 431-301.000.

Traben, Josef, to Gebruder Linck, Maschinenfabric u. Eisengiesserei "Gatterlinck". Apparatus for producing squared timbers by means of non-chip severing of boards therefrom. 4,589,456, Cl. 144-3.00P.

Tracy, Michael J., to Xerox Corporation. Document set separator and stack height sensor. 4,589,645, Cl. 271-3.100.

Trailer Train Company: *See—*
Brodeur, Rene H.; and Terlecky, Boris S., 4,589,558, Cl. 213-50.000.

Transilwrap Company: *See—*
Korinek, Robin, 4,589,942, Cl. 156-148.000.

"Transinnov" Kozlekedesi Muszaki Fejleszto Leanyvallalat: *See—*
Tamasi, Attila; Kardos, Mihaly; and Farago, Laszlo , 4,589,273, Cl. 73-11.000.

Trautenberg, Elmar: *See—*
Breimesser, Fritz; Hassler, Dietrich; Hundt, Eckart; Maderlechner, Gerd; and Trautenberg, Elmar, 4,589,284, Cl. 73-626.000.

Treiber, Helmut: *See—*
Fursich, Manfred; Findeis, Gunter; Treiber, Helmut; Fergg, Berthold; and Thurm, Siegfried, 4,589,766, Cl. 355-38.000.

Treiber, Jurgen: *See—*
Stumpp, Gerhard; Hofmann, Karl; Treiber, Jurgen; and Wellein, Horst, 4,589,596, Cl. 239-397.500.

Tremblay, Gerald J. Method of making solar heater. 4,589,186, Cl. 29-434.000.

Trent Box Manufacturing Co., Inc.: *See—*
Swanhart, David E., 4,589,588, Cl. 229-41.00R.

Triumph-Adler, A.G.: *See—*
Lendl, Joseph, 4,589,788, Cl. 400-187.000.

Trop, Moshe, to Ben-Gurion University of the Negev Research and Development Authority. Powdered composition for making acidified milk products. 4,590,077, Cl. 426-61.000.

Troy, Daniel J., to Du Pont de Nemours, E. I., and Company. Dual-layer coating containing aluminum-flake pigment and coated article. 4,590,235, Cl. 524-439.000.

Trumbull, Robert E.: *See—*
Frame, Wayne W.; and Trumbull, Robert E., 4,590,520, Cl. 358-163.000.

Trumpp, Hans-Joachim: *See—*
Behringer, Uwe; Greschner, Johann; and Trumpp, Hans-Joachim, 4,589,952, Cl. 156-628.000.

Trutek Research, Inc.: *See—*
Nowacki, Christopher; and Brisson, Alfred, 4,589,684, Cl. 285-319.000.

TRW Inc.: *See—*
Hsu, Ting-Ih; and Simonutti, Mario D., 4,590,446, Cl. 333-125.000.

Tryckluftteknik Harald Neumann AB: *See—*
Neumann, Harald P. G., 4,589,310, Cl. 82-1.400.

Tsai, Ching-Fu: *See—*
Liu, Yih H.; and Hour, Jiin Y., 4,589,214, Cl. 33-531.000.

Tsuboi, Masaharu, to Honda Giken Kogyo Kabushiki Kaisha. V-type multicylinder internal combustion engine. 4,589,382, Cl. 123-90.310.

Tsuboi, Shinichi: *See*—
Shiokawa, Kozo; Kagabu, Shinzo; and Tsuboi, Shinichi, 4,590,272, Cl. 544-335.000.
Tsubokura, Yoshihisa; Yamamoto, Sumio; Aoishi, Eiji; and Fujita, Tamio, to Kanegafuchi Kagaku Kogyo Kabushiki Kaisha. Heat-resistant CPVC resin composition. 4,590,232, Cl. 524-178.000.
Tsubouchi, Natsuro; and Denda, Masahiko, to Mitsubishi Denki Kabushiki Kaisha. Method for producing a Schottky barrier light detecting device. 4,589,189, Cl. 29-571.000.
Tsuda, Masaaki, to Kabushiki Kaisha Takara. Straw adhering apparatus for beverage vessels. 4,589,947, Cl. 156-521.000.
Tsuda, Minoru: *See*—
Nakane, Hisashi; Yokota, Akira; Yabuta, Mitsuo; Tsuda, Minoru; and Ishii, Wataru, 4,590,149, Cl. 430-325.000.
Tsuji, Kouji: *See*—
Tokushima, Takashige; Okitsu, Kingo; Mochizuki, Yoshiyuki; and Tsuji, Kouji, 4,589,396, Cl. 123-559.000.
Tsujide, Tohru: *See*—
Hirakawa, Noboru; and Tsujide, Tohru, 4,590,508, Cl. 357-41.000.
Tsujikawa, Yozaburo: *See*—
Tasaka, Takeo; Kawaguchi, Akiyoshi; and Tsujikawa, Yozaburo, 4,590,234, Cl. 524-413.000.
Tsukada, Kouji: *See*—
Sugiyama, Jun; Nonomura, Yutaka; Tsukada, Kouji; Shimaoka, Keiichi; Takeuchi, Masaharu; and Takeuchi, Takashi, 4,589,290, Cl. 73-862.360.
Tsukui, Takaaki: *See*—
Miura, Seishi; and Tsukui, Takaaki, 4,589,387, Cl. 123-198.00F.
Tsumura, Makoto; and Takeuchi, Ryozo, to Hitachi, Ltd. Thermal head. 4,590,489, Cl. 346-76.0PH.
Tsunefuji, Katsuhiko: *See*—
Maitani, Yoshihisa; Tsunefuji, Katsuhiko; and Yamasaki, Masafumi, 4,589,754, Cl. 354-431.000.
Maitani, Yoshihisa; Tsunefuji, Katsuhiko; and Yamasaki, Masafumi, 4,589,755, Cl. 354-431.000.
Maitani, Yoshihisa; Tsunefuji, Katsuhiko; and Yamasaki, Masafumi, 4,589,757, Cl. 354-458.000.
Tsurumaru, Kazuhiko: *See*—
Yazaki, Jinichi; and Tsurumaru, Kazuhiko, 4,590,131, Cl. 428-516.000.
Tsuruoka, Mitsuharu; and Sasaki, Keiji, to Victor Company of Japan, Ltd. Magnetic recording and/or reproducing apparatus operable with an adapter for a miniature type tape cassette. 4,590,528, Cl. 360-94.000.
Tsuruta, Orihiro; Oki, Yasuo; and Zinbo, Yasugi, to Orihiro Co., Ltd. Apparatus for preventing creases in transverse sealing. 4,589,247, Cl. 53-550.000.
Tsuzuki, Akio, to Tomy Kogyo, Co. Inc. Miniature action toy. 4,589,660, Cl. 273-1.0GA.
Tucker, James R.; and Riley, Dennis P., to Procter & Gamble Company, The. Fluronaphthalene chromium tricarbonyls useful as hydrogenation catalysts for polyunsaturated fatty acid residue-containing compositions. 4,590,007, Cl. 260-409.000.
Tung, Ker-Kong: *See*—
Cragle, Linda K.; Harris, Paul C.; Lee, Shih-Yun; Tung, Ker-Kong; and Vodian, Morton A., 4,590,169, Cl. 436-523.000.
Tungate, Freddie L.: *See*—
Bennett, James G., Jr.; and Tungate, Freddie L., 4,590,307, Cl. 568-804.000.
Turgeon, Thomas A., to Minnesota Mining and Manufacturing Company. Ground clip for photoconductive film. 4,589,714, Cl. 339-14.00R.
Turner, Paul F., to BSD Medical Corporation. Apparatus for creating hyperthermia in tissue. 4,589,423, Cl. 128-804.000.
Twardzik, Daniel R.; and Todaro, George J., to Oncogen. Platelet related growth regulator. 4,590,003, Cl. 530-330.000.
Uchida, Mitsuru: *See*—
Aoki, Mitsuo; Inoue, Satoru; Yamaguchi, Kimitoshi; Uchida, Mitsuru; Tomita, Masami; and Uematsu, Chiaki, 4,590,141, Cl. 430-108.000.
Uchiyama, Masaki: *See*—
Mitsuhashi, Yasuo; Takenouchi, Masanori; Tajima, Hatsuo; Uchiyama, Masaki; Urawa, Motoo; and Okado, Kenji, 4,590,140, Cl. 430-102.000.
Ueda, Jitsuhiko; Tomono, Yutaka; and Tanaka, Kazuhiko, to Hitachi Zosen Corporation. High-hardness heat-resistant alloy. 4,590,035, Cl. 420-449.000.
Ueda, Shigeki, to Matsushita Electric Industrial Co., Ltd. Automatic heating apparatus employing weight and gas sensors. 4,590,350, Cl. 219-10.55B.
Uematsu, Chiaki: *See*—
Aoki, Mitsuo; Inoue, Satoru; Yamaguchi, Kimitoshi; Uchida, Mitsuru; Tomita, Masami; and Uematsu, Chiaki, 4,590,141, Cl. 430-108.000.
Ueno, Hiroshi: *See*—
Imai, Masafumi; Yamamoto, Tadashi; Furuhashi, Hiroyuki; Ueno, Hiroshi; and Inaba, Naomi, 4,590,325, Cl. 585-512.000.
Uhl, Jurgen: *See*—
Irmscher, Klaus; Jonas, Rochus; Uhl, Jurgen; and Schorscher, Ernst, 4,590,180, Cl. 514-46.000.
Uhlig, Uwe, to Hauni-Werke Korber & Co. KG. Mounting for rotary grinding and dressing tools. 4,589,232, Cl. 51-168.000.
Ullman, Edwin F., to Syntex (U.S.A.) Inc. Sampling device. 4,589,421, Cl. 128-763.000.
Ulrich, Reinhard: *See*—
Dyott, Richard B.; Ulrich, Reinhard; and Meyer, John D., 4,589,728, Cl. 350-96.300.
Umemura, Yoshiyuki, to Tokyo Shibaura Denki Kabushiki Kaisha. Image data processing apparatus for performing spatial filtering of image data. 4,590,582, Cl. 364-724.000.
Umina, Anthony P. Process and apparatus for preparing canned baked products. 4,590,078, Cl. 426-113.000.
Umino, Hiroshi: *See*—
Yonemura, Shigehiro; Umino, Hiroshi; Kume, Masao; Abe, Mitsuo; and Miyatake, Satoshi, 4,589,230, Cl. 51-95.0GH.
Unimation, Inc.: *See*—
Stol, Israel, 4,590,358, Cl. 219-136.000.
Union Carbide Corporation: *See*—
Dombek, Bernard D., 4,590,216, Cl. 518-700.000.
Hiscock, Willis E.; Cassidy, Robert T.; and Werner, Robert G., 4,589,888, Cl. 55-26.000.
Kinkade, Nancy E., 4,590,314, Cl. 568-909.000.
Mellors, Geoffrey W., 4,590,059, Cl. 423-605.000.
Union Oil Company of California: *See*—
Young, Donald C., 4,589,925, Cl. 134-3.000.
Union Rheinische Braunkohlen Kraftstoff Aktiengesellschaft: *See*—
Korff, Joachim; and Keim, Karl-Heinz, 4,590,306, Cl. 568-804.000.
Uniroyal Chemical Company, Inc.: *See*—
Paeglis, Arnis U.; and Weaver, Ebon P., 4,589,804, Cl. 405-270.000.
Unisearch Limited: *See*—
Alexander, Peter W.; and Haddad, Paul R., 4,589,958, Cl. 204-1.00T.
Green, Martin A.; and Blakers, Andrew W., 4,589,191, Cl. 29-572.000.
United Aircraft Products, Inc.: *See*—
Wunder, John E., 4,589,478, Cl. 165-76.000.
United Kingdom Atomic Energy Authority: *See*—
North, John M., 4,589,197, Cl. 29-623.100.
Thatcher, Gordon; Ferguson, Barry G.; and Winstanley, John P., 4,590,347, Cl. 219-10.49R.
United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See*—
Saunders, Frances C., 4,589,735, Cl. 350-338.000.
U.S. Amada Limited: *See*—
Kawano, Susumu, 4,589,317, Cl. 83-400.000.
United States of America
Air Force: *See*—
Bluzer, Nathan, 4,590,505, Cl. 357-24.000.
Burkett, Bill E., 4,590,476, Cl. 343-7.400.
Meier, Michael J., 4,590,492, Cl. 346-107.00R.
Pieroway, Chesley S.; Blount, Alonzo; Britton, George L.; and Krile, David J., 4,590,471, Cl. 340-825.690.
Wallace, J. Shield; and Arnold, Fred E., 4,590,304, Cl. 568-766.000.
Army: *See*—
Brown, Jerry A., 4,590,475, Cl. 340-966.000.
Chen, Pi-Fuay; Seemuller, William W.; and Rohde, Frederick W., 4,590,608, Cl. 382-43.000.
Dinan, John H.; and Gutierrez, William A., 4,589,192, Cl. 29-572.000.
Ellin, Robert I.; and Zvirblis, Peter, 4,590,166, Cl. 436-96.000.
Jacobs, Harold, deceased; and Horn, Robert E., 4,590,441, Cl. 331-107.0DP.
Wortman, Donald E.; Dropkin, Herbert; and Leavitt, Richard P., 4,590,596, Cl. 372-2.000.
Commerce: *See*—
Long-sheng, Ma; Hollberg, Leo; Shirley, Jon H.; and Hall, John L., 4,590,597, Cl. 372-32.000.
Energy: *See*—
Anderson, Thomas T.; Roop, Conard J.; Schmidt, Kenneth J.; and Brewer, John, 4,590,431, Cl. 324-443.000.
Fukushima, Eiichi; Roeder, Stephen B. W.; Assink, Roger A.; and Gibson, Atholl A. V., 4,590,427, Cl. 324-318.000.
Praeg, Walter F., 4,590,423, Cl. 324-158.00F.
Navy: *See*—
Hearst, Peter J., 4,590,100, Cl. 427-327.000.
Patten, Raymond A.; and Blodgett, Jerry A., 4,589,772, Cl. 356-353.000.
Rousseau, David G., 4,589,342, Cl. 102-377.000.
Vittoria, Carmine, 4,590,448, Cl. 333-205.000.
U.S. Philips Corporation: *See*—
Esser, Leonard J. M., 4,590,506, Cl. 357-24.000.
Esser, Leonard J. M.; Vaes, Henricus M. J.; and Ludikhuize, Adrianus W., 4,590,509, Cl. 357-53.000.
Hoeks, Gerardus P. F.; and Tak, Marinus G. A., 4,590,405, Cl. 313-486.000.
Sander, Jorg, 4,589,291, Cl. 73-862.650.
van Glabbeek, Hendrik F., 4,590,616, Cl. 455-319.000.
Woerlee, Pierre H.; and Verhoeven, Johannes F. C. M., 4,590,093, Cl. 427-79.000.
United States Surgical Corporation: *See*—
Green, David T., 4,589,416, Cl. 128-334.00C.
Markus, Richard L., 4,589,631, Cl. 254-28.000.
United Technologies Corporation: *See*—
Arrigoni, John P., 4,589,175, Cl. 29-156.80B.
Barto, John J., Jr.; Walsh, Peter M.; Fitzpatrick, Peter R.; Dondero, Richard F.; Demers, Kenneth P.; and Gardner, Stephen M., 4,590,578, Cl. 364-513.000.

Brennan, John J.; Chyung, Kenneth; and Taylor, Mark P., 4,589,900, Cl. 65-33.000.
Kozlin, Joseph R., 4,589,824, Cl. 416-97.00R.
Olster, Elliot F.; and Chase, Vance A., 4,589,564, Cl. 220-3.000.
Zwicke, Philip E.; Rosenbush, David M.; and Couch, Robert P., 4,590,562, Cl. 364-431.020.

Unitrode Corporation: *See*—
Valley, Richard L., 4,590,391, Cl. 307-355.000.

Universal Manufacturing Corporation: *See*—
Weissman, Adrian M., 4,590,453, Cl. 336-180.000.

Universal-Rundle Corporation: *See*—
Gaffney, Thomas E.; and Baker, Scott C., 4,589,629, Cl. 251-288.000.

University of California, The Regents of the: *See*—
Helinski, Donald R.; and Ditta, Gary S., 4,590,163, Cl. 435-317.000.

University of Illinois: *See*—
Morkoc, Hadis, 4,590,502, Cl. 357-22.000.

University of Iowa Research Foundation: *See*—
Laughlin, Donald E.; Wilson, Robert F.; and Drews, Thomas A., 4,589,419, Cl. 128-663.000.

University of Michigan, Regents of the: *See*—
Voorhees, John J.; and Wierenga, Wendell, 4,590,211, Cl. 514-594.000.

University of Missouri, Curators of the: *See*—
Buening, Gerald M.; and Carson, Charles A., 4,590,072, Cl. 424-93.000.

University of Nebraska, Board of Regents of the: *See*—
McCarthy, Robert E., 4,590,181, Cl. 514-54.000.

University of Tennessee Research Corporation, The: *See*—
Dorsett, Preston H., 4,590,156, Cl. 435-5.000.

University of Toledo, The: *See*—
Smith, Clifford J., 4,589,372, Cl. 119-51.00R.

University Patents, Inc.: *See*—
Markovitz, Alvin; Zehnbauer, Barbara A.; Schoemaker, Joyce M.; and Charette, Marc F., 4,590,159, Cl. 435-68.000.

Upjohn Company, The: *See*—
Aristoff, Paul A.; and Sih, John C., 4,590,297, Cl. 568-374.000.
Voorhees, John J.; and Wierenga, Wendell, 4,590,211, Cl. 514-594.000.
Wallach, Donald P., deceased; Ayer, Donald E.; and Szmuszkovicz, Jacob, 4,590,187, Cl. 514-211.000.
Warpehoski, Martha A., 4,590,280, Cl. 548-491.000.

Urabe, Shuuji: *See*—
Saito, Shigeki; and Urabe, Shuuji, 4,590,442, Cl. 331-107.00A.

Uramoto, Yuji, to Canon Kabushiki Kaisha. Thermal recorder. 4,590,485, Cl. 346-76.0PH.

Urano, Fumio: *See*—
Tomori, Yasumasa; Okudaira, Sadao; Aoki, Harumi; Urano, Fumio; and Morisawa, Tahei, 4,589,750, Cl. 354-271.100.

Urawa, Motoo: *See*—
Imai, Eiichi; and Urawa, Motoo, 4,590,139, Cl. 430-45.000.
Mitsuhashi, Yasuo; Takenouchi, Masanori; Tajima, Hatsuo; Uchiyama, Masaki; Urawa, Motoo; and Okado, Kenji, 4,590,140, Cl. 430-102.000.

Urry, Dan W. Enzymatically crosslinked bioelastomers. 4,589,882, Cl. 623-11.000.

Ushiyama, Hisayuki: *See*—
Yamazaki, Masuo; Matsumoto, Toru; Wakamiya, Katsutoshi; Ohsaki, Ichiro; Nakahara, Toshiaki; and Ushiyama, Hisayuki, 4,590,142, Cl. 430-138.000.

Usui, Hirotaro: *See*—
Yoshizawa, Hideo; Nushi, Masaaki; Sakurai, Kaoru; Usui, Hirotaro; Iida, Naohiro; Tanaka, Togo; and Honjo, Seiichiro, 4,589,901, Cl. 65-107.000.

Usui Kokusai Sangyo Kabushiki Kaisha: *See*—
Kanesaka, Hiroshi, 4,589,859, Cl. 474-148.000.

Utsumi, Hiroshi: *See*—
Sasaki, Yutaka; Nakamura, Toshio; Utsumi, Hiroshi; Murata, Hiroshi; and Nakamura, Yoshimi, 4,590,173, Cl. 502-204.000.
Sasaki, Yutaka; Utsumi, Hiroshi; Mori, Kunio; Yamamoto, Hiroshi; Nakamura, Yoshimi; Moriya, Kiyoshi; Morii, Akimitsu; Noda, Mikio; and Kunitani, Miki, 4,590,175, Cl. 502-249.000.

Uzbekov, Alexandr A.: *See*—
Yurkov, Leonid I.; Busse-Machukas, Vladimir B.; Lvovich, Florenty I.; Kubasov, Vladimir L.; Uzbekov, Alexandr A.; Mazanko, Anatoly F.; and Fedotova, Natalya S., 4,589,969, Cl. 204-290.00F.

Vachon, Louis F., to Caterpillar Tractor Co. Tool for removal of an engine cylinder liner. 4,589,180, Cl. 29-263.000.

Vaes, Henricus M. J.: *See*—
Esser, Leonard J. M.; Vaes, Henricus M. J.; and Ludikhuize, Adrianus W., 4,590,509, Cl. 357-53.000.

Vaguine, Victor A., to Varian Associates, Inc. Microwave hyperthermia applicator with variable radiation. 4,589,424, Cl. 128-804.000.

Valid Logic Systems, Inc.: *See*—
Widdoes, L. Curtis, Jr., 4,590,581, Cl. 364-578.000.

Valle, Franco; and Sofi, Sergio, to Ing. C. Olivetti & C., S.p.A. Point of sale printer. 4,589,784, Cl. 400-56.000.

Valley, Richard L., to Unitrode Corporation. Multi-input zero offset comparator. 4,590,391, Cl. 307-355.000.

Van Dal, David J., to Quinsee, Michael J.; and Eller, John. Engine. 4,589,377, Cl. 123-25.00C.

Vandenberghe, Claude; and Le Morvan, Andre , to Electricite de France (Service National). Apparatus for monitoring cell capacity in a storage battery. 4,590,430, Cl. 324-427.000.

VanderEyk, Garry J.: *See*—
Jerry, James H.; and VanderEyk, Garry J., 4,589,295, Cl. 74-360.000.

Vanderspurt, Thomas H.: *See*—
Richard, Michael A.; Vanderspurt, Thomas H.; and Montagna, Angelo A., 4,590,177, Cl. 502-328.000.

van der Wal, Hans; and Scheffer, Hendrik J., to Shell Oil Company. Movable catalyst bed reactor. 4,590,045, Cl. 422-216.000.

Van Domelen, Timothy D.: *See*—
Kasper, William W.; Quon, Willard L.; and Van Domelen, Timothy D., 4,590,054, Cl. 423-467.000.

van Gasselt, Max L. G.; and Rappoldt, Louis M., to Nederlandse Centrale Organisatie Voor Toegepast-Natuurivetenschap-. Fluidized bed combustion apparatus. 4,589,352, Cl. 110-216.000.

van Glabbeek, Hendrik F., to U.S. Philips Corporation. Re-tuning device comprising a switching mixer stage and a tuning oscillator. 4,590,616, Cl. 455-319.000.

VanOmmeren, James: *See*—
Chen, Michael S. K.; Goff, Stephen P.; and VanOmmeren, James, 4,589,896, Cl. 62-28.000.

Van Slyke, Vernon C.: *See*—
Glodowski, Robert J.; and Van Slyke, Vernon C., 4,589,934, Cl. 148-145.000.

VanTielen, Willem R. Solenoid switch. 4,590,449, Cl. 335-126.000.

Van Tilburg, Kees J., to Procter & Gamble Company, The. Sanitary napkin. 4,589,876, Cl. 604-385.00R.

Varallo, Anthony B.: *See*—
Butler, Scott J.; Regan, Robert J.; and Varallo, Anthony B., 4,590,436, Cl. 330-277.000.
Butler, Scott J.; Regan, Robert J.; and Varallo, Anthony B., 4,590,437, Cl. 330-277.000.

Varian Associates, Inc: *See*—
Vaguine, Victor A., 4,589,424, Cl. 128-804.000.

Varwig, Juergen; and Hamprecht, Gerhard, to BASF Aktiengesellschaft. Preparation of fluoromethylthiobenzoyl fluorides. 4,590,016, Cl. 260-544.00F.

Vass, Richard T., to O'Brien Corporation, The. Method and apparatus for forming a chemical composition from cross-linking components and product of the method. 4,590,218, Cl. 521-50.000.

Vasta, Joseph A., to Du Pont de Nemours, E. I., and Company. Electrically conductive coating composition of a glycidyl acrylic polymer and a reactive polysiloxane. 4,589,999, Cl. 252-511.000.

Vatafu-Gaitan, Laurentiu: *See*—
Apetrei, Constantin; Slaifer, Sigismund; Vatafu-Gaitan, Laurentiu; Stefanescu, Dumitru; Marinescu, Stelian; and Catana, Marin, 4,589,534, Cl. 192-18.00B.

Vaughn, John. Method and apparatus for forming the head of a high torque fastener. 4,589,154, Cl. 10-7.000.

VEB Kombinat Polygraph "Werner Lamberz" Leipzig: *See*—
Prescher, Dieter, 4,589,649, Cl. 271-107.000.

VEB Kombinat Textima: *See*—
Marx, Karl; Offermann, Peter; Reumann, Ralf-Dieter; Magel, Matthias; Frenzel, Bertram; and Grenzendorfer, Dietmar, 4,589,169, Cl. 19-304.000.

Veitscher Magnesitwerke-Actien-Gesellschaft: *See*—
Horak, Josef; and Kassegger, Friedrich, 4,589,474, Cl. 165-9.100.

Veld, Albertus: *See*—
Ligtenberg, Hendrikus C. G.; and Veld, Albertus, 4,589,970, Cl. 204-406.000.

Venkatesan, Valadi N.; and Venuto, Paul B., to Mobil Oil Corporation. Viscous oil recovery. 4,589,487, Cl. 166-261.000.

Venuto, Paul B.: *See*—
Venkatesan, Valadi N.; and Venuto, Paul B., 4,589,487, Cl. 166-261.000.

Vepa Aktiengesellschaft: *See*—
Fleissner, Gerold, 4,589,173, Cl. 28-269.000.

Verhoeven, Johannes F. C. M.: *See*—
Woerlee, Pierre H.; and Verhoeven, Johannes F. C. M., 4,590,093, Cl. 427-79.000.

Verlinden, Willy G.: *See*—
De Schamphelaere, Lucien A.; Librecht, Freddy M.; and Verlinden, Willy G., 4,589,762, Cl. 355-14.00D.

Vermont American Corporation: *See*—
McCord, Wilfred M., Jr., 4,589,458, Cl. 144-238.000.

Vernice, Gerald G.: *See*—
Townsend, Palmer W.; Huang, Chialang; and Vernice, Gerald G., 4,590,310, Cl. 568-842.000.

Versteegh, Willem M.: *See*—
Mohebban, Manoochehr; Versteegh, Willem M.; and Toy, Lester T., 4,589,939, Cl. 156-49.000.

Vianova Kunstharz, A.G.: *See*—
Daimer, Wolfgang; Gmoser, Johann; and Schipfer, Rudolf, 4,590,245, Cl. 525-504.000.
Pampouchidis, Georg; and Deu, Herbert, 4,590,009, Cl. 560-332.000.

Vickers Shipbuilding & Engineering Limited: *See*—
Scott, John R. A., 4,589,935, Cl. 148-147.000.

Victor Company of Japan, Ltd.: *See*—
Takanashi, Itsuo; Tanaka, Hideshi; Ohara, Terumi; Kato, Shigeru; Takahashi, Toshinori; Kiuchi, Tsutomu; and Kitamura, Hiroki, 4,590,490, Cl. 346-76.0PH.
Tsuruoka, Mitsuharu; and Sasaki, Keiji, 4,590,528, Cl. 360-94.000.

Videocolor: *See*—
Giancaterini, Gabriel; and Pacifici, Francisco, 4,590,092, Cl. 427-68.000.

Villamagna, Andrew C.; and Simone, Michelle. High blower unit for air distribution system. 4,589,331, Cl. 98-39.100.

Villetto, Robert T., Jr.: *See*—
Goth, George R.; Hansen, Thomas A.; and Villetto, Robert T., Jr., 4,589,193, Cl. 29-576.00W.

Vipont Laboratories, Inc.: *See*—
Southard, George L., 4,590,061, Cl. 424-7.100.

Vittoria, Carmine, to United States of America, Navy. Tunable microwave filters utilizing a slotted line circuit. 4,590,448, Cl. 333-205.000.

Vock, Manfred H.: *See*—
Pittet, Alan O.; Muralidhara, Ranya; Vock, Manfred H.; Miller, Kevin P.; Luccarelli, Domenick, Jr.; and Wiener, Charles, 4,590,082, Cl. 426-535.000.

Vodian, Morton A.: *See*—
Cragle, Linda K.; Harris, Paul C.; Lee, Shih-Yun; Tung, Ker-Kong; and Vodian, Morton A., 4,590,169, Cl. 436-523.000.

Voessing, Walter: *See*—
Platte, Hans-Joachim; Voessing, Walter; Oberjatzas, Gunter; and Schroder, Ernst, 4,590,531, Cl. 360-47.000.

Voest-Alpine International Corporation: *See*—
Misera, Erich; Floh, Hubert; and Haargassner, Reinhard, 4,589,468, Cl. 164-418.000.

Vogel, Allen J., to Courtesy Mold & Tool Corporation. Eating utensil. 4,589,204, Cl. 30-324.000.

Volkswagenwerk Aktiengesellschaft: *See*—
Schulze, Bernd-Guido, 4,589,703, Cl. 303-6.00R.

Volpenhein, Carl X., to American Siding Discount Distributor, Inc. Wall construction. 4,589,241, Cl. 52-315.000.

Volz, Hartwig; and Schnepel, Frank-Michael. Process for recovering oil from subterranean formations. 4,589,489, Cl. 166-274.000.

von Bockh, Peter, to BBC Brown, Boveri & Company, Ltd. Wet-steam turbine plant. 4,589,258, Cl. 60-679.000.

von der Decken, Claus-Benedict: *See*—
Iniotakis, Nicolas; von der Decken, Claus-Benedict; and Frohling, Werner, 4,589,891, Cl. 55-158.000.

Voorhees, John J.; and Wierenga, Wendell, to Upjohn Company, The; and University of Michigan, Regents of the. Process for therapeutic treatment. 4,590,211, Cl. 514-594.000.

Vought, Donald W.: *See*—
Hsu, Joseph C.; Vought, Donald W.; and Walbrun, George H., 4,590,106, Cl. 428-35.000.

Vu, Tho T., to Honeywell Inc. Current feedback Schottky logic. 4,590,392, Cl. 307-446.000.

Vyas, Dolatrai M.; Kaneko, Takushi; and Doyle, Terrence W., to Bristol-Myers Company. Bis-amidines. 4,590,074, Cl. 544-58.200.

W. R. Grace & Co., Cryovac Div.: *See*—
Schoenberg, Julian H., 4,590,124, Cl. 428-339.000.

W. Schlafhorst & Co.: *See*—
Reiners, Franz-Josef; Knors, Herbert; Tholen, Leo; and Toputt, Heinz-Lorenz, 4,589,602, Cl. 242-35.50R.

Wackerle, Peter; Schulz, Ralf-Thilo; Sperber, Franz; Koletzko, Wolfram; and Prochaska, Wolfgang, to Messerschmitt-Boelkow-Blohm Gesellschaft mit beschraenkter Haftung. Safety steering column made of fiber-reinforced synthetic materials. 4,589,679, Cl. 280-777.000.

Wadsworth, William: *See*—
Kendall, William F.; Smith, Richard A.; and Wadsworth, William, 4,589,240, Cl. 52-309.110.

Wagner, Walter D., to New England Microwave Corporation. High dynamic range amplifier with low noise and low distortion. 4,590,434, Cl. 330-102.000.

Wagner, William R., to Rockwell International Corporation. Pre-regenerated staged-combustion rocket engine. 4,589,253, Cl. 60-204.000.

Wakamiya, Katsutoshi: *See*—
Yamazaki, Masuo; Matsumoto, Toru; Wakamiya, Katsutoshi; Ohsaki, Ichiro; Nakahara, Toshiaki; and Ushiyama, Hisayuki, 4,590,142, Cl. 430-138.000.

Wakaoka, Shunsuke: *See*—
Takezawa, Isao; and Wakaoka, Shunsuke, 4,590,580, Cl. 364-571.000.

Walbrun, George H.: *See*—
Hsu, Joseph C.; Vought, Donald W.; and Walbrun, George H., 4,590,106, Cl. 428-35.000.

Walker, David A.: *See*—
Hilditch, Edward A.; Hambling, Robert E.; Sparks, Colin R.; and Walker, David A., 4,590,208, Cl. 514-500.000.

Walker, Dean M.: *See*—
Walker, Wesley M.; Walker, Robert W.; and Walker, Dean M., 4,589,249, Cl. 56-16.600.

Walker Manufacturing Company: *See*—
Walker, Wesley M.; Walker, Robert W.; and Walker, Dean M., 4,589,249, Cl. 56-16.600.

Walker, Ralph M., Jr., to General Dynamics Corporation. Store load and ejector device for aircraft. 4,589,615, Cl. 244-137.00R.

Walker, Robert W.: *See*—
Walker, Wesley M.; Walker, Robert W.; and Walker, Dean M., 4,589,249, Cl. 56-16.600.

Walker, Wesley M.; Walker, Robert W.; and Walker, Dean M., to Walker Manufacturing Company. Mowing apparatus. 4,589,249, Cl. 56-16.600.

Wallace, J. Shield; and Arnold, Fred E., to United States of America, Air Force. Protected ethynylated phenols. 4,590,304, Cl. 568-766.000.

Wallace, Joseph W.: *See*—
Lee, Harry W., Jr.; and Wallace, Joseph W., 4,589,270, Cl. 72-348.000.

Wallach, Donald P., deceased (by Wallach, Vera, legal representative); Ayer, Donald E.; and Szmuszkovicz, Jacob, to Upjohn Company, The. Phospholipase A_2 inhibition using 4,1-benzoxazepine-2-(3H)-ones. 4,590,187, Cl. 514-211.000.

Wallach, Vera, legal representative: *See*—
Wallach, Donald P., deceased; Ayer, Donald E.; and Szmuszkovicz, Jacob, 4,590,187, Cl. 514-211.000.

Wallbillich, Guenter, to BASF Aktiengesellschaft. Stabilization of photopolymerizable mixtures. 4,590,146, Cl. 430-281.000.

Walsh, Peter M.: *See*—
Barto, John J., Jr.; Walsh, Peter M.; Fitzpatrick, Peter R.; Dondero, Richard F.; Demers, Kenneth P.; and Gardner, Stephen M., 4,590,578, Cl. 364-513.000.

Walulik, James J.: *See*—
Pottier, Alain P.; Walulik, James J.; and Simmons, Ralph L., 4,589,717, Cl. 339-94.00M.

Warner-Lambert Company: *See*—
Butler, Donald E., 4,590,204, Cl. 514-424.000.
Wei, You C.; Cherukuri, Subraman R.; Hriscisce, Frank; Piccolo, Dominic J.; and Bilka, Kenneth P., 4,590,075, Cl. 426-5.000.

Warner, Nicholas M., to Burroughs Corporation. Positioning servomechanisms. 4,590,527, Cl. 360-78.000.

Warpehoski, Martha A., to Upjohn Company, The. Preparing indoline derivatives. 4,590,280, Cl. 548-491.000.

Warren, Lawrence L. Adjustable door jamb assembly. 4,589,229, Cl. 49-505.000.

Warszawski, Bernard; Fauvel, Pierre; and Arlie, Jean, to Occidental Chemical Corporation. Fuel cell structures. 4,590,134, Cl. 429-35.000.

Warszawski, Bernard; Fauvel, Pierre; and Dupre, Sylvain, to Occidental Chemical Corporation. Fuel cell structures. 4,590,135, Cl. 429-38.000.

Wasco Products, Inc.: *See*—
Sampson, Robert C.; and Flanigan, Sean T., 4,589,238, Cl. 52-200.000.

Washbourn, Jack, to Westinghouse Brake and Signal. Force applying system combining direct and spring-applied electric actuators. 4,589,531, Cl. 192-2.000.

Wassdahl, Lars A. Garbage container to be emptied with the aid of vacuum. 4,589,592, Cl. 232-43.100.

Watanabe, Satoshi: *See*—
Seki, Mitsuaki; Watanabe, Satoshi; and Miyakawa, Hideaki, 4,589,787, Cl. 400-145.200.

Watanabe, Takashi; and Sasage, Yoshihiro, to Nippondenso Co., Ltd. Electro-optical liquid detector assembly. 4,589,771, Cl. 356-38.000.

Watanabe, Toshiyuki: *See*—
Iwata, Yasuhiro; Watanabe, Toshiyuki; and Kobayashi, Seiichi, 4,589,768, Cl. 355-50.000.

Watanabe, Yoshitaka: *See*—
Asano, Kajio; Sato, Toshihiko; Oda, Haruo; Abe, Yasuaki; and Watanabe, Yoshitaka, 4,589,184, Cl. 29-430.000.

Watanabe, Yoshitane; Suzuki, Keitaro; and Teranishi, Masayuki, to Nissan Chemical Industries, Ltd. Process for preparing colloidal solution of antimony pentoxide. 4,589,997, Cl. 252-313.100.

Wawretzko, Joachim: *See*—
Sieber, Albrecht; and Wawretzko, Joachim, 4,589,391, Cl. 123-357.000.

Waymouth Farms Inc.: *See*—
Knight, Gerard S.; Dreyer, Perry A.; and Gjelhaug, Robert B., 4,589,576, Cl. 222-357.000.

Wayne State University: *See*—
Thomas, Robert L.; Kuo, Pao-Kuang; and Favro, Lawrence D., 4,589,783, Cl. 374-45.000.

Wazaki, Yoshio; Koike, Akihiko; and Koike, Yuzuru, to Honda Giken Kogyo K.K. Air-fuel ratio feedback control method for internal combustion engines. 4,589,390, Cl. 123-339.000.

Weatherby, Robert G.; and Stein, W. Fred, to Huebner, James A., a part interest. Self closing lift ring. 4,589,163, Cl. 16-124.000.

Weatherford U.S., Inc.: *See*—
Langer, Friedrich H.; and Stringfellow, William D., 4,589,495, Cl. 166-383.000.

Weaver, Ebon P.: *See*—
Paeglis, Arnis U.; and Weaver, Ebon P., 4,589,804, Cl. 405-270.000.

Webasto-Werk W. Baier GmbH & Co.: *See*—
Kempter, Michael, 4,589,694, Cl. 296-213.000.

Weber, Walter: *See*—
Schauwecker, Frieder; and Weber, Walter, 4,590,542, Cl. 362-61.000.

Wedl, Peter: *See*—
Erwied, Werner; Wegemund, Bernd; Wedl, Peter; and Worschech, Kurt, 4,590,233, Cl. 524-357.000.

Wegemund, Bernd: *See*—
Erwied, Werner; Wegemund, Bernd; Wedl, Peter; and Worschech, Kurt, 4,590,233, Cl. 524-357.000.

Weggel, Ralph W., to Berwind Corporation. Removable mold segments for rotary molds. 4,589,831, Cl. 425-195.000.

Wehrmann, Rick S.: *See*—
Lerner, Hershey; Easter, William M.; and Wehrmann, Rick S., 4,589,165, Cl. 17-11.000.

Wei, You C.; Cherukuri, Subraman R.; Hriscisce, Frank; Piccolo, Dominic J.; and Bilka, Kenneth P., to Warner-Lambert Company. Elastomer encapsulation of flavors and sweeteners, long lasting flavored chewing gum compositions based thereon and process of preparation. 4,590,075, Cl. 426-5.000.

Weihrauch, Georg, to Coronet-Werke Heinrich Schlerf GmbH. Device having synthetic bristles butt welded to support plate. 4,589,791, Cl. 401-290.000.

Weisenburger, Lawrence P., to AMP Incorporated. Electrical connector kit. 4,589,715, Cl. 339-17.00F.

Weiss, Wilhelm, to Krones AG Hermann Kronseder Maschinenfabrik. Container filling device. 4,589,453, Cl. 141-39.000.

Weisser, Bernard G.: *See—*
Caye, Paul D.; Jamain, Patrice C.; and Weisser, Bernard G., 4,589,707, Cl. 308-10.000.

Weissman, Adrian M., to Universal Manufacturing Corporation. Autotransformer with common winding having oppositely wound sections. 4,590,453, Cl. 336-180.000.

Wellein, Horst: *See—*
Stumpp, Gerhard; Hofmann, Karl; Treiber, Jurgen; and Wellein, Horst, 4,589,596, Cl. 239-397.500.

Wellendorf, Klaus, to Dr.-Ing. Rudolf Hell GmbH. Method and apparatus for modifying color reduction depending on tone. 4,590,515, Cl. 358-75.000.

Welsh, Peter W.: *See—*
Welsh, William C.; and Welsh, Peter W., 4,589,577, Cl. 222-518.000.

Welsh, William C.; and Welsh, Peter W. Dispenser closure. 4,589,577, Cl. 222-518.000.

Werkzeugmaschinenfabrik Oerlikon-Buhrle AG: *See—*
Muller, Kurt; Kalt, Paul; Steiner, Pirmin; and Hurlemann, Ernst, 4,589,325, Cl. 89-33.020.

Wernborg, Rune, to Mediplast AB. Suction device and a method of manufacturing the same. 4,589,869, Cl. 604-119.000.

Werner, Robert G.: *See—*
Hiscock, Willis E.; Cassidy, Robert T.; and Werner, Robert G., 4,589,888, Cl. 55-26.000.

Westby, George R., to GTE Communication Systems Corporation. Condensation heating facility control system. 4,589,956, Cl. 202-170.000.

Western Digital Corporation: *See—*
Stieglitz, Mark, 4,590,468, Cl. 340-825.500.

Western Geophysical Co. of America: *See—*
Savit, Carl H., 4,589,285, Cl. 73-655.000.

Westinghouse Brake and Signal: *See—*
Washbourn, Jack, 4,589,531, Cl. 192-2.000.

Westinghouse Electric Corp.: *See—*
Adinolfi, Philip J.; and Redpath, Arthur B., 4,589,817, Cl. 414-729.000.
Boltrek, Henry; and Parvis, Edward F., 4,589,539, Cl. 198-331.000.
Feilchenfeld, Michal M., 4,590,604, Cl. 381-42.000.
Goldstein, Norman P.; Service, Alex D.; and Todt, William H., 4,590,401, Cl. 313-93.000.
Machado, Octavio J.; and Efferding, Larry E., 4,590,383, Cl. 250-506.100.
Martens, Alan; and Myers, Gerry A., 4,589,255, Cl. 60-646.000.
Nokovich, Nick, 4,589,309, Cl. 82-1.200.
Potochnik, Lawrence M.; and Semethy, Kenneth F., 4,590,329, Cl. 174-88.00R.
Sanjana, Zal N.; and Marchetti, Joseph R., 4,590,539, Cl. 361-400.000.
Schmidt, Donald J., 4,589,610, Cl. 244-3.190.

Westlake, David J.: *See—*
Ballantine, James A.; Gregory, Reginald; Purnell, John H.; Thomas, John M.; and Westlake, David J., 4,590,294, Cl. 560-247.000.

Weston, Henry C., deceased: *See—*
Ruddock, William U., administrator; and Weston, Henry C., deceased, 4,589,248, Cl. 54-24.000.

Westvaco Corporation: *See—*
Dilling, Peter, 4,590,262, Cl. 530-500.000.
Forbes, Hampton E., Jr., 4,589,619, Cl. 248-174.000.
Hancock, Louie R., 4,589,648, Cl. 271-106.000.

Wetmore, Halsey J., to Adams Hard-Facing Company, Inc. Plow share overcap. 4,589,498, Cl. 172-719.000.

Weyerhaeuser Company: *See—*
Adams, Terry N.; Spurrell, Robert M.; Karsner, Grant G.; Golike, Gregory P.; and Lincoln, James F. L., 4,589,356, Cl. 110-347.000.
Lincoln, James F. L.; Buder, Manfred K.; Brown, Craig A.; Golike, Gregory P.; and Spurrell, Robert M., 4,589,357, Cl. 110-347.000.

White, Charlene: *See—*
Seltzer, Raymond; Patel, Ambelal R.; Stewart, Peter W.; and White, Charlene, 4,590,231, Cl. 524-100.000.

White, John F.: *See—*
Grey, Roger A.; White, John F.; and Beals, Eva M., 4,590,313, Cl. 568-907.000.

Whitehead, Verlon E.: *See—*
Hunt, Ronald E.; and Whitehead, Verlon E., 4,589,621, Cl. 248-586.000.

Whiten, Douglas: *See—*
Gebhardt, James L.; Hanna, James; and Whiten, Douglas, 4,589,349, Cl. 108-102.000.

Whittar Industries Ltd.: *See—*
Proffitt, John P., 4,589,513, Cl. 180-287.000.

Widauer, Josef O., to Medichemie AG. Soporific containing lorazepam. 4,590,191, Cl. 514-221.000.

Widdoes, L. Curtis, Jr., to Valid Logic Systems, Inc. Method and apparatus for modeling systems of complex circuits. 4,590,581, Cl. 364-578.000.

Wiener, Charles: *See—*
Pittet, Alan O.; Muralidhara, Ranya; Vock, Manfred H.; Miller, Kevin P.; Luccarelli, Domenick, Jr.; and Wiener, Charles, 4,590,082, Cl. 426-535.000.

Wierenga, Wendell: *See—*
Voorhees, John J.; and Wierenga, Wendell, 4,590,211, Cl. 514-594.000.

Wieske, Theophil: *See—*
Pronk, Jacobus N.; Soltau, Martin; and Wieske, Theophil, 4,590,087, Cl. 426-603.000.

Wiggs, B. Ryland. Piggy back water power generator. 4,590,386, Cl. 290-54.000.

Wiklund, Klas R.; and Johansson, Erik I., to Pharos AB. Method and apparatus for sampling measurement data from a chemical process. 4,590,466, Cl. 340-870.280.

Wilcox, Milton E., to National Semiconductor Corporation. Voltage controlled RC oscillator circuit. 4,590,444, Cl. 331-111.000.

Wilhelm, Jurgen; and Mahnau, Heinrich, to Kernforschungszentrum Karlsruhe GmbH. Measuring arrangement for determining the gaseous radioiodine concentration in a carrier gas. 4,590,372, Cl. 250-304.000.

Willenbacher, Erich; and Jehle, Fritz, to Pfaff Industriemaschinen GmbH. Sewing machine for automatically making edge-parallel seams. 4,589,363, Cl. 112-308.000.

Williams, David E.: *See—*
Parekh, Dhan N.; and Williams, David E., 4,589,233, Cl. 51-399.000.

Williams, James E., to Cuisinarts, Inc. Ice chopper apparatus for producing ice particles of controlled size. 4,589,599, Cl. 241-37.500.

Williams, Joel: *See—*
Schwartz, Abraham; Graper, Jane; and Williams, Joel, 4,589,873, Cl. 604-265.000.

Williams, John E.: *See—*
Ryer, Jack; Shih, Chung Kun; and Williams, John E., 4,589,991, Cl. 252-47.000.

Williams, Joseph R., II. Releasable snap connector. 4,589,716, Cl. 339-91.00R.

Williams, Russell H., to Thomas & Betts Corporation. Optical fiber retainer. 4,589,727, Cl. 350-96.200.

Williams, Will T. Steep terrain stabilizing devices for lawn mowers. 4,589,252, Cl. 56-255.000.

Willinger, Allan H., to Willinger Bros., Inc. Removable power pack pump assembly. 4,589,982, Cl. 210-169.000.

Willinger Bros., Inc.: *See—*
Willinger, Allan H., 4,589,982, Cl. 210-169.000.

Wilson, Charles A.: *See—*
Fung, Alexander P.; and Wilson, Charles A., 4,590,279, Cl. 546-345.000.

Wilson, David: *See—*
Phillips, Emyr; and Wilson, David, 4,589,992, Cl. 252-75.000.

Wilson, Dennis A.; and Anesi, Dennis W., to Ansan Industries Limited. Lock for vehicle hood release for theft prevention. 4,589,514, Cl. 180-289.000.

Wilson, Robert F.: *See—*
Laughlin, Donald E.; Wilson, Robert F.; and Drews, Thomas A., 4,589,419, Cl. 128-663.000.

Wimmer, Robert: *See—*
Gurtler, Franz; and Wimmer, Robert, 4,589,680, Cl. 280-801.000.

Windmoller & Holscher: *See—*
Achelpohl, Fritz, 4,589,183, Cl. 29-426.500.

Winkler, Harry L. Vehicular arc welder. 4,590,357, Cl. 219-130.100.

Winkler, Peter M.: *See—*
Rogoff, Mortimer; Winkler, Peter M.; and Ackley, John N., 4,590,569, Cl. 364-452.000.

Winstanley, John P.: *See—*
Thatcher, Gordon; Ferguson, Barry G.; and Winstanley, John P., 4,590,347, Cl. 219-10.49R.

Winzer, Gerhard, to Siemens Aktiengesellschaft. Multiple branching light wave guide element. 4,589,724, Cl. 350-96.150.

Winzer, Gerhard, to Siemens Aktiengesellschaft. Star coupler for local networks of optical communications system. 4,590,619, Cl. 455-612.000.

Wirz, Josef, to Robert Bosch GmbH. Electronic control system for fuel injection of a diesel engine. 4,589,392, Cl. 123-357.000.

Wittels, Emanuel: *See—*
Glazer, Sam D.; Baumbach, James; Borg, Anita; and Wittels, Emanuel, 4,590,554, Cl. 364-200.000.

Woerlee, Pierre H.; and Verhoeven, Johannes F. C. M., to U.S. Philips Corporation. Method of manufacturing a pattern of conductive material. 4,590,093, Cl. 427-79.000.

Woernle, Rolf: *See—*
Erckel, Rudiger; Franz, Raimund; Woernle, Rolf; and Riehm, Theodor, 4,589,924, Cl. 127-37.000.

Wofor AG: *See—*
Hecht, Sidney M.; Lynn, David G.; and Reddy, Kalakota S., 4,590,264, Cl. 536-18.200.

Wojcak, Eugene: *See—*
Miller, Birgit J.; Bell, Harvey; and Wojcak, Eugene, 4,590,084, Cl. 426-557.000.

Wolaver, Dan H., to General Signal. Wide range clock recovery circuit. 4,590,602, Cl. 375-120.000.

Woldy, Paul N.; Stevenson, John S.; and Preston, William E., to Texaco Inc. Multi-element thermocouple. 4,590,326, Cl. 136-233.000.

Wolf, Stephen F.; and Liu, Chung-Tsing, to Economics Laboratory, Inc. Synthesis of alkyl phosphinate salts. 4,590,014, Cl. 260-502.40R.

Wolff Walsrode Aktiengesellschaft: *See—*
Luhmann, Erhard; Hoppe, Lutz; and Szablikowski, Klaus, 4,590,019, Cl. 264-3.400.

Wolgemuth, Richard L.: *See—*
Carter, John P., Jr.; and Wolgemuth, Richard L., 4,590,063, Cl. 424-19.000.

Wood, Prentice J., to Mead Corporation, The. Method of closing an end loading carton. 4,589,246, Cl. 53-491.000.

Woodward, William. Conduit bending level. 4,589,213, Cl. 33-371.000.

Woosley, Kenneth D.: *See—*
Christiansen, Robert A.; Rose, Frank M., Jr.; Smith, James R.; and Woosley, Kenneth D., 4,589,584, Cl. 228-110.000.

World Video Library, Inc.: *See—*
Abraham, Nicholas F., 4,590,516, Cl. 358-86.000.

Worschech, Kurt: *See—*
Erwied, Werner; Wegemund, Bernd; Wedl, Peter; and Worschech, Kurt, 4,590,233, Cl. 524-357.000.

Wortman, Donald E.; Dropkin, Herbert; and Leavitt, Richard P., to United States of America, Army. Method and apparatus for modulating a diffraction radiation generator. 4,590,596, Cl. 372-2.000.

Wossner, Felix: *See—*
Axthammer, Ludwig; and Wossner, Felix, 4,589,528, Cl. 188-279.000.

Wray, Gary Q., to Halliburton Company. Downhole tool utilizing well fluid compression. 4,589,485, Cl. 166-250.000.

Wright-Malta Corporation: *See—*
Aronstein, Jesse, 4,589,324, Cl. 84-454.000.

Wu, Mu-Yen M.; and Ball, Lawrence E., to Standard Oil Company, The. Process for the preparation of polyamide from unsaturated nitrile and ammonium salt of unsaturated carboxylic acid. 4,590,251, Cl. 526-311.000.

Wuerzer, Bruno: *See—*
Hagen, Helmut; Ziegler, Hans; and Wuerzer, Bruno, 4,589,910, Cl. 71-90.000.

Wuhrmann, Juan C.; Seiter, Wolfgang; Giesen, Brigitte; and Schmadel, Edmund, to Henkel Kommanditgesellschaft auf Aktien. Foam regulators containing paraffin hydrocarbons and hydrophobic silica. 4,590,237, Cl. 524-480.000.

Wunder, Friedrich: *See—*
Leupold, Ernst I.; Schmidt, Hans-Joachim; and Wunder, Friedrich, 4,590,217, Cl. 518-716.000.

Wunder, John E., to United Aircraft Products, Inc. Pressure protected tubular heat exchanger. 4,589,478, Cl. 165-76.000.

Wydevan, Robert M., to Donaldson Company, Inc. Fluid filtering device. 4,589,983, Cl. 210-317.000.

Xerox Corporation: *See—*
Fantuzzo, Joseph; Monkelbaan, Edwin R.; and Till, Henry R., 4,589,759, Cl. 355-8.000.
Harrigan, Michael E.; Rees, James D.; and Deibler, Melvin E., 4,589,736, Cl. 350-413.000.
Perun, William D.; and Booth, Ronald P., Sr., 4,589,765, Cl. 355-3.0SH.
Polit, Neil A., 4,589,945, Cl. 156-497.000.
Roller, George J., 4,589,647, Cl. 271-94.000.
Silverberg, Morton, 4,589,651, Cl. 271-245.000.
Silverberg, Morton, 4,589,652, Cl. 271-245.000.
Stemmle, Denis J., 4,589,653, Cl. 271-293.000.
Tracy, Michael J., 4,589,645, Cl. 271-3.100.

Xoma Corporation: *See—*
Scannon, Patrick J.; Spitler, Lynn E.; Lee, Howard M.; Kawahata, Russell T.; and Mischak, Ronald P., 4,590,071, Cl. 424-85.000.

Xuan, Mai T.: *See—*
Mokdad, Mohamed; and Xuan, Mai T., 4,590,412, Cl. 318-696.000.

Yabuki, Yoshiharu: *See—*
Hirai, Hiroyuki; Yabuki, Yoshiharu; Takeuchi, Masashi; and Aono, Toshiaki, 4,590,154, Cl. 430-559.000.

Yabunaka, Kiyoshi: *See—*
Hamano, Isao; Morishita, Akira; Akae, Yoshifumi; Tanaka, Toshinori; Matsumoto, Kouichi; Gotou, Takeo; and Yabunaka, Kiyoshi, 4,590,385, Cl. 290-38.00E.

Yabuta, Mitsuo: *See—*
Nakane, Hisashi; Yokota, Akira; Yabuta, Mitsuo; Tsuda, Minoru; and Ishii, Wataru, 4,590,149, Cl. 430-325.000.

Yagi, Michio; and Ito, Eiji, to Konishiroku Photo Industry Co., Ltd. Camera device. 4,589,604, Cl. 242-71.600.

Yaguchi, Toshiyuki; Kanuma, Akira; and Tamaru, Kiichiro, to Tokyo Shibaura Denki Kabushiki Kaisha. Method and system for processing exponents in floating-point multiplication. 4,590,584, Cl. 364-748.000.

Yahagi, Masakichi; Igaki, Tetsuo; Yosinaka, Sinzi; Morita, Kousaku; Saito, Morikuni; and Kinoshita, Kimiaki, to Shin Nisso Kako Co., Ltd. Chromogenic recording materials. 4,590,498, Cl. 346-208.000.

Yamada, Shigemichi: *See—*
Ito, Hiroshi; and Yamada, Shigemichi, 4,589,532, Cl. 192-0.030.

Yamada, Yasuhiro; Imamura, Takeshi; Honda, Hidemasa; Sawaki, Toru; and Sasaki, Hideharu, to Director-General of the Agency of Industrial Science and Technology. Pitch-based carbon fibers and pitch compositions and precursor fibers therefor. 4,590,055, Cl. 423-447.400.

Yamaguchi, Kazuo: *See—*
Sato, Osamu; and Yamaguchi, Kazuo, 4,589,296, Cl. 74-411.000.

Yamaguchi, Ken, to Honda Giken Kogyo Kabushiki Kaisha. Motorcycle radiator. 4,589,512, Cl. 180-229.000.

Yamaguchi, Kimitoshi: *See—*
Aoki, Mitsuo; Inoue, Satoru; Yamaguchi, Kimitoshi; Uchida, Mitsuru; Tomita, Masami; and Uematsu, Chiaki, 4,590,141, Cl. 430-108.000.

Yamaguchi, Yuzo; and Sato, Toshiya, to Takasago Perfumery Co., Ltd. Growth inhibitor for cariogenic bacteria. 4,590,215, Cl. 514-729.000.

Yamaka, Shiyouichi: *See—*
Ouchi, Teruo; Tamada, Kazukiyo; and Yamaka, Shiyouichi, 4,589,403, Cl. 128-4.000.

Yamamoto, Hiroshi: *See—*
Sasaki, Yutaka; Utsumi, Hiroshi; Mori, Kunio; Yamamoto, Hiroshi; Nakamura, Yoshimi; Moriya, Kiyoshi; Morii, Akimitsu; Noda, Mikio; and Kunitani, Miki, 4,590,175, Cl. 502-249.000.

Yamamoto, Khoichi; and Kasuda, Takashi, to Pegasus Sewing Machine Mfg. Co. Ltd. Sewing machine top feed. 4,589,364, Cl. 112-311.000.

Yamamoto, Naoki: *See—*
Koike, Yasuhisa; Kaneko, Kazuhiro; Inaba, Kazuo; and Yamamoto, Naoki, 4,590,340, Cl. 200-61.540.

Yamamoto, Osamu: *See—*
Tanaami, Shigeyuki; and Yamamoto, Osamu, 4,590,417, Cl. 323-229.000.

Yamamoto, Sumio: *See—*
Tsubokura, Yoshihisa; Yamamoto, Sumio; Aoishi, Eiji; and Fujita, Tamio, 4,590,232, Cl. 524-178.000.

Yamamoto, Tadashi: *See—*
Imai, Masafumi; Yamamoto, Tadashi; Furuhashi, Hiroyuki; Ueno, Hiroshi; and Inaba, Naomi, 4,590,325, Cl. 585-512.000.

Yamamuro, Sigeaki: *See—*
Abo, Keiju; Kumura, Haruyoshi; Hirano, Hiroyuki; Tanaka, Yoshikazu; Yamamuro, Sigeaki; and Morimoto, Yoshiro, 4,590,561, Cl. 364-424.100.

Yamanaka, Hideaki: *See—*
Takaya, Takao; Sakane, Kazuo; and Yamanaka, Hideaki, 4,590,186, Cl. 514-202.000.

Yamasaki, Masafumi: *See—*
Maitani, Yoshihisa; Tsunefuji, Katsuhiko; and Yamasaki, Masafumi, 4,589,754, Cl. 354-431.000.
Maitani, Yoshihisa; Tsunefuji, Katsuhiko; and Yamasaki, Masafumi, 4,589,755, Cl. 354-431.000.
Maitani, Yoshihisa; Tsunefuji, Katsuhiko; and Yamasaki, Masafumi, 4,589,757, Cl. 354-458.000.

Yamasaki, Masayoshi: *See—*
Kohzai, Tetsuo; Murai, Naoyuki; and Yamasaki, Masayoshi, 4,589,518, Cl. 182-2.000.

Yamashita, Mitsuru; and Shima, Kouji, to Daicel Chemical Industries, Ltd. Process for preparing cellulose acetate. 4,590,266, Cl. 536-69.000.

Yamashita, Sadahiko: *See—*
Ishigaki, Isao; Makimoto, Mitsuo; and Yamashita, Sadahiko, 4,590,443, Cl. 331-117.00R.

Yamashita, Yoshito: *See—*
Ohno, Youzi; Sato, Yoshiaki; Yamashita, Yoshito; and Mizukami, Etsuo, 4,589,455, Cl. 141-311.00R.

Yamato, Hideyuki: *See—*
Maeda, Yuji; Yamato, Hideyuki; Fujii, Takayoshi; Kobayashi, Yasuhiko; Saito, Kenichi; Kato, Tadaaki; and Yoshikumi, Chikao, 4,590,184, Cl. 514-167.000.

Yamato Scale Company, Ltd.: *See—*
Hirano, Takashi, 4,589,506, Cl. 177-25.000.

Yamazaki, Masuo; Matsumoto, Toru; Wakamiya, Katsutoshi; Ohsaki, Ichiro; Nakahara, Toshiaki; and Ushiyama, Hisayuki, to Canon Kabushiki Kaisha. Capsule toner. 4,590,142, Cl. 430-138.000.

Yamazaki, Yasuo; and Suzuki, Takehiko, to Nippon Petrochemicals Company. Process for preparing aldehydes. 4,590,281, Cl. 548-545.000.

Yan, Tsoung Y.: *See—*
Green, Gary J.; and Yan, Tsoung Y., 4,589,978, Cl. 208-113.000.

Yana, Masasumi, to Kabushiki Kaisha Toshiba. Thermal ink transfer printing apparatus. 4,590,486, Cl. 346-76.0PH.

Yanagi, Masaaki; Ono, Satoshi; Toda, Takao; Kashiwagi, Kazuo; Endo, Makoto; and Saito, Yoshihiro, to Canon Kabushiki Kaisha. Reader-printer. 4,589,767, Cl. 355-45.000.

Yanagiuchi, Yukihiro: *See—*
Sakakima, Hiroshi; Satomi, Mitsuo; Yanagiuchi, Yukihiro; and Senno, Harufumi, 4,590,530, Cl. 360-122.000.

Yang, Swe-Wong: *See—*
Jackson, Melvin R.; Gigliotti, Michael F. X., Jr.; and Yang, Swe-Wong, 4,589,937, Cl. 148-404.000.

Yaniv, Zvi; Bar-on, Yair; Cannella, Vincent D.; and Hansell, Gregory L., to Energy Conversion Devices, Inc. Displays and subassemblies having improved pixel electrodes. 4,589,733, Cl. 350-332.000.

Yano, Takeshi: *See—*
Fukui, Izumu; Hamatsuki, Takeshige; Yano, Takeshi; Sato, Eiichi; and Inui, Osamu, 4,589,786, Cl. 400-124.000.

Yano, Yasushi: *See—*
Kamada, Keiichi; Iiyama, Katuaki; Yano, Yasushi; and Itoh, Isao, 4,590,230, Cl. 524-77.000.

Yaskawa Electric Mfg. Co., Ltd.: *See—*
Nio, Satoru; Hamashima, Toyoji; and Sato, Shinobu, 4,590,577, Cl. 364-513.000.

Yasuda, Akira; Irie, Toshio; and Konishi, Motoyuki, to Kawasaki Steel Corporation. Method of producing a thin steel sheet having baking hardenability and adapted for drawing. 4,589,931, Cl. 148-12.00C.

Yasuda, Satoshi: *See—*
Nakagome, Hideki; and Yasuda, Satoshi, 4,589,953, Cl. 156-645.000.

Yasui, Hideo, to Tokyo Juki Industrial Co., Ltd. Sewing control system for a sewing machine. 4,589,360, Cl. 112-121.110.

Yatabe, Toshiaki; Suzuki, Nobuo; and Itakura, Yoshio, to Teijin Limited. Selective light transmission sheet. 4,590,118, Cl. 428-215.000.

Yazaki, Jinichi; and Tsurumaru, Kazuhiko, to Toyo Seikan Kaisha, Ltd. Packaging material. 4,590,131, Cl. 428-516.000.

Yeshaya, Amalia: *See*—
Adams, Isabelle M.; Carlson, James M.; Rooks, James B.; and Yeshaya, Amalia, 4,589,420, Cl. 128-702.000.
Yevich, Joseph P.: *See*—
Smith, David W.; and Yevich, Joseph P., 4,590,196, Cl. 514-253.000.
Yodono, Kazuei: *See*—
Kurumaji, Masanobu; Sano, Tsutomu; Kondo, Hiroaki; Mizutani, Masao; and Yodono, Kazuei, 4,589,839, Cl. 425-547.000.
Yokoi, Gunpei; and Shirai, Ichiro, to Nintendo Co., Ltd. Foldable liquid crystal display unit. 4,589,659, Cl. 273-1.0GC.
Yokooku, Katsuhiko: *See*—
Oda, Hiroyuki; Yokooku, Katsuhiko; Seo, Nobuhide; and Shiraishi, Hideo, 4,589,302, Cl. 74-866.000.
Yokota, Akira: *See*—
Nakane, Hisashi; Yokota, Akira; Yabuta, Mitsuo; Tsuda, Minoru; and Ishii, Wataru, 4,590,149, Cl. 430-325.000.
Yokoyama, Tadashi: *See*—
Iwata, Masayosi; Hayashi, Yoshikazu; and Yokoyama, Tadashi, 4,590,341, Cl. 200-61.540.
Yonemura, Shigehiro; Umino, Hiroshi; Kume, Masao; Abe, Mitsuo; and Miyatake, Satoshi, to Honda Giken Kogyo Kabushiki Kaisha. Grinding machine. 4,589,230, Cl. 51-95.0GH.
Yorke, Monica A., to Calgon Corporation. Polyelectrolyte and surfactant compositions for controlling alkaline earth metal scales. 4,589,985, Cl. 210-699.000.
Yoshida Industry Co., Ltd.: *See*—
Hatakeyama, Yoshiharu; and Teshima, Kenzo, 4,589,429, Cl. 132-79.00R.
Yuhara, Yukitomo, 4,589,431, Cl. 132-83.00R.
Yoshida, Katsuhiro; and Horiguchi, Hiroshi, to Aichi Electric Works Co., Ltd. Transfer switch. 4,590,387, Cl. 307-64.000.
Yoshida, Kiyomitsu: *See*—
Haga, Takahiro; Toki, Tadaaki; Koyanagi, Toru; Okada, Hiroshi; Yoshida, Kiyomitsu; and Imai, Osamu, 4,590,182, Cl. 514-80.000.
Yoshida Kogyo K. K.: *See*—
Imai, Shigeru, 4,589,182, Cl. 29-410.000.
Yoshida, Michiyasu: *See*—
Kume, Satoru; Yoshida, Michiyasu; Konno, Yoshihiro; Kume, Tateo; Takada, Hiroaki; Shinsei, Kiyoichi; Matsumoto, Akio; and Ogawa, Hitoshi, 4,589,254, Cl. 60-286.000.
Yoshida, Toshiro: *See*—
Takahashi, Yasuyuki; Yoshida, Toshiro; and Takahashi, Takeshi, 4,590,086, Cl. 426-602.000.
Yoshida, Yutaka; Hirayama, Shozo; Kusunoki, Hiroyuki; Shishido, Yoshio; Matsuo, Kazumasa; Mizumoto, Morihide; Kato, Masahiko; and Hagino, Tadao, to Olympus Optical Co., Ltd. Surgical cutting instrument. 4,589,414, Cl. 128-305.000.
Yoshii, Toshiya: *See*—
Kawakami, Ken-ichi; Yoshii, Toshiya; Suzuki, Masaru; and Okasaka, Hotsuma, 4,590,119, Cl. 428-216.000.
Yoshikumi, Chikao: *See*—
Maeda, Yuji; Yamato, Hideyuki; Fujii, Takayoshi; Kobayashi, Yasuhiko; Saito, Kenichi; Kato, Tadaaki; and Yoshikumi, Chikao, 4,590,184, Cl. 514-167.000.
Yoshimi, Keiichi: *See*—
Tanaka, Toshihiro; Yoshimi, Keiichi; and Goto, Shigeo, 4,589,941, Cl. 156-140.000.
Yoshimura, Munehiro: *See*—
Inoue, Takao; and Yoshimura, Munehiro, 4,590,493, Cl. 346-135.100.
Yoshimura, Susumu: *See*—
Takahashi, Shozo; Yoshimura, Susumu; and Ozaki, Junji, 4,590,541, Cl. 361-433.000.
Yoshino Kogyosho Co., Ltd.: *See*—
Hayashi, Yoshiaki; and Takada, Takuzo, 4,589,559, Cl. 215-1.00C.
Ota, Akiho; and Negishi, Fumio, 4,590,021, Cl. 264-25.000.
Yoshizawa, Hideo; Nushi, Masaaki; Sakurai, Kaoru; Usui, Hirotaro; Iida, Naohiro; Tanaka, Togo; and Honjo, Seiichiro, to Nippon Sheet Glass Co., Ltd. Apparatus for and method of bending glass sheets. 4,589,901, Cl. 65-107.000.
Yoshizawa, Masao: *See*—
Itaba, Yasushi; Saito, Keichiro; Tabuchi, Jyoichi; and Yoshizawa, Masao, 4,590,020, Cl. 264-22.000.
Yosinaka, Sinzi: *See*—
Yahagi, Masakichi; Igaki, Tetsuo; Yosinaka, Sinzi; Morita, Kousaku; Saito, Morikuni; and Kinoshita, Kimiaki, 4,590,498, Cl. 346-208.000.
Young, Donald C., to Union Oil Company of California. Methods for cleaning materials. 4,589,925, Cl. 134-3.000.
Young Engineering, Inc.: *See*—
Young, William O., Jr.; Hankinson, Julian E., Jr.; and Jennings, Mansel A., 4,589,580, Cl. 226-119.000.
Young, William O., Jr.; Hankinson, Julian E., Jr.; and Jennings, Mansel A., to Young Engineering, Inc. Web handling and accumulation system. 4,589,580, Cl. 226-119.000.
Yudate, Kozo; Ohsugi, Yukihiro; Kamishita, Mamoru; and Nagasawa, Ken. Method of producing a precursor pitch for carbon fiber. 4,589,975, Cl. 208-44.000.
Yugari, Yasumi: *See*—
Sakakibara, Shumpei; Yugari, Yasumi; and Hashimoto, Shigebumi, 4,590,178, Cl. 514-18.000.
Yugengaisha Kyodogiken: *See*—
Orii, Masaru, 4,589,605, Cl. 242-55.000.
Yuhara, Yukitomo, to Yoshida Industry Co., Ltd. Vanity case. 4,589,431, Cl. 132-83.00R.
Yurkov, Leonid I.; Busse-Machukas, Vladimir B.; Lvovich, Florenty I.; Kubasov, Vladimir L.; Uzbekov, Alexandr A.; Mazanko, Anatoly F.; and Fedotova, Natalya S. Electrode for electrolysis of solutions of electrolytes and process for producing same. 4,589,969, Cl. 204-290.00F.
Z-Tech Enterprises Inc.: *See*—
Moulinie, Raoul M.; and Gagne, Guy, 4,589,242, Cl. 52-396.000.
Zamore, Leonard, to Sepreh, Inc. Method of treatment for herpes. 4,590,214, Cl. 514-702.000.
Zansky, Zoltan: *See*—
O'Connor, Donald F.; and Zansky, Zoltan, 4,590,395, Cl. 307-570.000.
Zanussi Grandi Impianti S.p.A.: *See*—
Del Fabbro, Claudio, 4,590,361, Cl. 219-439.000.
Zarges, Frank W.; and Stiegler, Gerd, to Zarges, Frank W. Woodworking plane. 4,589,209, Cl. 30-478.000.
Zehler, Eugene R.; and Beimesch, Bruce J., to National Distillers and Chemical Corporation. Mist lubricant compositions. 4,589,990, Cl. 252-56.00S.
Zehnbauer, Barbara A.: *See*—
Markovitz, Alvin; Zehnbauer, Barbara A.; Schoemaker, Joyce M.; and Charette, Marc F., 4,590,159, Cl. 435-68.000.
Zeiner, Hartmut; Fischer, Jurgen; Heinz, Gerhard; Neumann, Peter; Nissen, Dietmar; and Schaefer, Gerhard, to BASF Aktiengesellschaft. Production of fiber-reinforced materials. 4,590,104, Cl. 427-389.900.
Zelenz, Martin L., to Regency Electronics, Inc. Television signal scrambling/descrambling system. 4,590,519, Cl. 358-120.000.
Zeller Corporation, The: *See*—
Mazziotti, Michael F.; and Mazziotti, Philip J., 4,589,856, Cl. 464-111.000.
Zenith Electronics Corporation: *See*—
Lachiw, Ark; and Stevanovich, Illia M., 4,589,228, Cl. 49-386.000.
Zenk, Daniel K.; and Michaelson, Wayne A., to Sperry Corporation. Forced clear of a memory time-out to a maintenance exerciser. 4,590,586, Cl. 364-900.000.
Zenyuu Ltd.: *See*—
Sato, Zenjiro; and Kazama, Kazuyosi, 4,589,903, Cl. 71-9.000.
Zettergren, Ted, to Hydrino AB. Control assembly. 4,590,454, Cl. 338-128.000.
Zeuner, Kenneth W.; Zeuner, Steven K.; and Zeuner, Thomas A. Reel speed valve assembly. 4,589,437, Cl. 137-117.000.
Zeuner, Steven K.: *See*—
Zeuner, Kenneth W.; Zeuner, Steven K.; and Zeuner, Thomas A., 4,589,437, Cl. 137-117.000.
Zeuner, Thomas A.: *See*—
Zeuner, Kenneth W.; Zeuner, Steven K.; and Zeuner, Thomas A., 4,589,437, Cl. 137-117.000.
Ziegler, Hans: *See*—
Hagen, Helmut; Ziegler, Hans; and Wuerzer, Bruno, 4,589,910, Cl. 71-90.000.
Ziegler, Udo: *See*—
Albert, Gert; Kamps, Manfred; Noweck, Klaus; Reichenauer, Ansgar; Scherf, Erich; and Ziegler, Udo, 4,590,289, Cl. 556-188.000.
Ziegler, William E. Multiple station, multiple clamp assembly rotary blow molding machines. 4,589,838, Cl. 425-540.000.
Ziggity Systems, Inc.: *See*—
Hostetler, Eldon; and Hostetler, Robert D., 4,589,373, Cl. 119-72.500.
Zimmern, Bernard; and Noda, Sadafumi, to Zimmern, Bernard. Method of lubricating bearings of a machine handling liquefiable gas. 4,589,826, Cl. 417-368.000.
Zinbo, Yasugi: *See*—
Tsuruta, Orihiro; Oki, Yasuo; and Zinbo, Yasugi, 4,589,247, Cl. 53-550.000.
Zingler, Christian J.: *See*—
Bedell, John R.; Friedmann, Paul G.; Kushnick, Julian H.; Rosenthal, Eli; Hubbard, James R.; and Zingler, Christian J., 4,589,470, Cl. 164-463.000.
Zinser Textilmaschinen GmbH: *See*—
Krieger, Klaus E., 4,589,168, Cl. 19-240.000.
Zofchak, Albert: *See*—
Deckner, George E.; O'Grady, Hedwig; and Zofchak, Albert, 4,590,069, Cl. 424-70.000.
Zolton, Raymond P.; Kaplan, Paul M.; and Padvelskis, John V., to Ortho Diagnostic Systems, Inc. Methods for preparation of highly purified, gamma globulins free of hepatitis-B-virus infectivity. 4,590,002, Cl. 530-386.000.
Zones, Stacey I., to Chevron Research Company. Hydrocracking process employing a new zeolite, SSZ-16. 4,589,976, Cl. 208-111.000.
Zones, Stacey I., to Chevron Research Company. Zeolite SSZ-19. 4,589,977, Cl. 208-111.000.
Zoran Corporation: *See*—
Gerzberg, Levy, 4,590,589, Cl. 365-100.000.
Zschokke Wartmann AG: *See*—
Kanis, Walter, 4,589,587, Cl. 228-183.000.
Zvirblis, Peter: *See*—
Ellin, Robert I.; and Zvirblis, Peter, 4,590,166, Cl. 436-96.000.
Zweifel, Terry L., to Sperry Corporation. Cruise airspeed control of aircraft altitude capture. 4,589,616, Cl. 244-180.000.
Zwicke, Philip E.; Rosenbush, David M.; and Couch, Robert P., to United Technologies Corporation. Statistically correlated electrostatic engine diagnostics. 4,590,562, Cl. 364-431.020.

LIST OF REISSUE PATENTEES

TO WHOM

PATENTS WERE ISSUED ON THE 20TH DAY OF MAY, 1986

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

Amann, August: *See—*
Hagen, Helmut; Amann, August; and Giertz, Hubert, Re. 32,154, Cl. 544-114.000.

BASF Aktiengesellschaft: *See—*
Hagen, Helmut; Amann, August; and Giertz, Hubert, Re. 32,154, Cl. 544-114.000.

CPC International Inc.: *See—*
Tamura, Masaki; Shimizu, Mizuho; and Tago, Minoru, Re. 32,153, Cl. 435-96.000.

Eastman Kodak Company: *See—*
Silverman, Robert A.; and Hoyen, Harry A., Re. 32,149, Cl. 430-409.000.

Furuhashi, Toshio: *See—*
Tokuda, Hiroastu; and Furuhashi, Toshio, Re. 32,156, Cl. 364-431.060.

Giertz, Hubert: *See—*
Hagen, Helmut; Amann, August; and Giertz, Hubert, Re. 32,154, Cl. 544-114.000.

Hagen, Helmut; Amann, August; and Giertz, Hubert, to BASF Aktiengesellschaft. Production of 2-(o-alkylthiophenyl)-1,3-diazocycloalkene hydrohalides. Re. 32,154, Cl. 544-114.000.

Hitachi, Ltd.: *See—*
Tokuda, Hiroastu; and Furuhashi, Toshio, Re. 32,156, Cl. 364-431.060.

Hoyen, Harry A.: *See—*
Silverman, Robert A.; and Hoyen, Harry A., Re. 32,149, Cl. 430-409.000.

Nevamar Corporation: *See—*
Scher, Herbert I.; and Ungar, Israel S., Re. 32,152, Cl. 428-148.000.

Nilssen, Ole K. High-efficiency tuned inverter circuit. Re. 32,155, Cl. 363-18.000.

Ransburg Corporation: *See—*
Scharfenberger, James A., Re. 32,151, Cl. 427-8.000.

Rice, Max. Weighted rotatable therapeutic exercise device. Re. 32,150, Cl. 272-128.000.

Scharfenberger, James A., to Ransburg Corporation. Variable low-pressure fluid color change cycle. Re. 32,151, Cl. 427-8.000.

Scher, Herbert I.; and Ungar, Israel S., to Nevamar Corporation. Abrasion resistant laminate. Re. 32,152, Cl. 428-148.000.

Shimizu, Mizuho: *See—*
Tamura, Masaki; Shimizu, Mizuho; and Tago, Minoru, Re. 32,153, Cl. 435-96.000.

Silverman, Robert A.; and Hoyen, Harry A., to Eastman Kodak Company. Photographic elements containing direct-positive emulsions and processes for their use. Re. 32,149, Cl. 430-409.000.

Tago, Minoru: *See—*
Tamura, Masaki; Shimizu, Mizuho; and Tago, Minoru, Re. 32,153, Cl. 435-96.000.

Tamura, Masaki; Shimizu, Mizuho; and Tago, Minoru, to CPC International Inc. Highly thermostable glucoamylaseand process for its production. Re. 32,153, Cl. 435-96.000.

Tokuda, Hiroastu; and Furuhashi, Toshio, to Hitachi, Ltd. Method and apparatus for controlling an internal combustion engine, particularly the starting up of the engine. Re. 32,156, Cl. 364-431.060.

Ungar, Israel S.: *See—*
Scher, Herbert I.; and Ungar, Israel S., Re. 32,152, Cl. 428-148.000.

LIST OF REEXAMINATION PATENTEES

TO WHOM

CERTIFICATES WERE ISSUED

Buss, Waldeen C.; Field, Leslie A.; and Robinson, Richard C., to Chevron Research Company. Hydrocarbon conversion process. B1 4,456,527, 5-20-86, Cl. 208-89.000.

Chevron Research Company: *See—*
Buss, Waldeen C.; Field, Leslie A.; and Robinson, Richard C., B1 4,456,527, Cl. 208-89.000.

Field, Leslie A.: *See—*
Buss, Waldeen C.; Field, Leslie A.; and Robinson, Richard C., B1 4,456,527, Cl. 208-89.000.

Fitzmaurice, Richard W., to FMC Corporation. Harvesting shaker for crops such as tomatoes or the like. B1 4,335,570, 5-20-86, Cl. 56-327.00R.

FMC Corporation: *See—*
Fitzmaurice, Richard W., B1 4,335,570, Cl. 56-327.00R.

Marine Electric Corporation: *See—*
Parke, Harry G.; and Tomsky, Harry W., B1 4,074,176, Cl. 318-371.000.

Parke, Harry G.; and Tomsky, Harry W., to Marine Electric Corporation. Motor protector. B1 4,074,176, 5-20-86, Cl. 318-371.000.

Robinson, Richard C.: *See—*
Buss, Waldeen C.; Field, Leslie A.; and Robinson, Richard C., B1 4,456,527, Cl. 208-89.000.

Sjoquist, John A. Method for separating a polypeptide from microorganisms. B1 3,850,798, 5-20-86, Cl. 260-112.00R.

Tomsky, Harry W.: *See—*
Parke, Harry G.; and Tomsky, Harry W., B1 4,074,176, Cl. 318-371.000.

LIST OF DESIGN PATENTEES

Akiyama, Kunio, to Sharp Corporation. Sphygmomanometer. 283,916, 5-20-86, Cl. D24-21.000.

Albright, Henry J., to Fawn Engineering Corporation. Vending cabinet. 283,903, 5-20-86, Cl. D20-4.000.

Althans, Richard K.: *See—*
Claxton, Bruce A.; and Althans, Richard K., 283,888, Cl. D13-8.000.

Anderka, Gerold; and Jozat, Walter. Circular spacer inserter for stringed rackets. 283,907, 5-20-86, Cl. D21-212.000.

AT&T Information Systems Inc.: *See—*
Gubser, Mark S.; Janczy, John R.; Mohr, Robert G.; and Prohaska, William F., 283,894, Cl. D14-114.000.

AT&T Technologies, Inc.: *See—*
Britz, David M.; Genaro, Donald M.; McGarvey, John N.; and Zambelli, Michael P., 283,890, Cl. D14-55.000.

ATG Autotelle-Grosshandel GmbH: *See—*
Koch, Adolf, 283,887, Cl. D12-181.000.

Baum, Ronald L., to SmithKline Beckman Corporation. Pharmaceutical tablet. 283,931, 5-20-86, Cl. D28-2.000.

Baxter Travenol Laboratories, Inc.: *See—*
Mathias, Jean M.; and Kersten, Jean, 283,919, Cl. D24-34.000.

Bergelin, Christopher S., to Gordon's Inc. Table. 283,863, 5-20-86, Cl. D6-477.000.

Bergelin, Christopher S., to Gordon's Inc. Table. 283,864, 5-20-86, Cl. D6-484.000.

Bergelin, Christopher S., to Gordon's Inc. Table. 283,865, 5-20-86, Cl. D6-484.000.

Bieganski, Zdzislaw. Wire stripper. 283,871, 5-20-86, Cl. D8-98.000.

Blahowicz, James S. Bulk food dispenser. 283,869, 5-20-86, Cl. D7-76.000.

Blood, Carl A. Game playing surface panel for an electronic game housing. 283,904, 5-20-86, Cl. D21-13.000.

Botros, Radamis: *See*—
Parshad, David; and Botros, Radamis, 283,891, Cl. D14-59.000.

Britz, David M.; Genaro, Donald M.; McGarvey, John N.; and Zambelli, Michael P., to AT&T Technologies, Inc. Calling card telephone. 283,890, 5-20-86, Cl. D14-55.000.

Burton, Parker & Schramm, P.C.: *See*—
Clendinen, Charles D., 283,872, Cl. D8-394.000.

Bussell, Vanda J. Bud vase. 283,879, 5-20-86, Cl. D11-152.000.

Buteau, Richard N. Housing for a flash device. 283,898, 5-20-86, Cl. D16-42.000.

Campbell, William P. Drinking vessel. 283,866, 5-20-86, Cl. D7-13.000.

Cantolino, Richard, to Mayfair Super Markets, Inc. Stackable three compartment bulk food display module. 283,860, 5-20-86, Cl. D6-471.000.

Cantolino, Richard, to Mayfair Super Markets, Inc. Stackable bulk food display module. 283,861, 5-20-86, Cl. D6-471.000.

Carlson, Arthur R., to Decor Corporation Pty., Ltd., The. Plate to support soil above a water reservoir in a planter. 283,880, 5-20-86, Cl. D11-164.000.

Cesaroni, William C.: *See*—
Dobson, William C.; and Cesaroni, William C., 283,932, Cl. D32-68.000.
Dobson, William C.; and Cesaroni, William C., 283,933, Cl. D32-68.000.

Chamberlain Manufacturing Corporation: *See*—
Henry, Susanne G.; Tsunemura, Kazuo; and Iha, Kiyoshi, 283,923, Cl. D25-49.000.

Chen, Henry T. H.; Chuang, William W. L.; and Lin, Tsai-Kuan. Velocipede. 283,883, 5-20-86, Cl. D12-107.000.

Chen, Sam, to Gissing Enterprises Inc. Nursing bottle. 283,920, 5-20-86, Cl. D24-47.000.

Chicago Booth Mfg., Co., Inc.: *See*—
Livieratos, Christos, 283,857, Cl. D6-364.000.

Chuang, William W. L.: *See*—
Chen, Henry T. H.; Chuang, William W. L.; and Lin, Tsai-Kuan, 283,883, Cl. D12-107.000.

Clairol Incorporated: *See*—
Wistrand, John, 283,853, Cl. D6-308.000.

Claxton, Bruce A.; and Althans, Richard K., to Motorola, Inc. Battery or similar article. 283,888, 5-20-86, Cl. D13-8.000.

Clendinen, Charles D., to Burton, Parker & Schramm, P.C. Retaining clip. 283,872, 5-20-86, Cl. D8-394.000.

Crystal Leisure, Inc.: *See*—
Walko, Stephen J., 283,851, Cl. D4-130.000.

Culshaw, Scott R. Dispensing bin. 283,935, 5-20-86, Cl. D34-39.000.

Cutler, Gordon L., to Quaker Oats Company, The. Monitor transmitter. 283,892, 5-20-86, Cl. D14-68.000.

Darome, Inc.: *See*—
Parshad, David; and Botros, Radamis, 283,891, Cl. D14-59.000.

Dart Industries Inc.: *See*—
Dobson, William C.; and Cesaroni, William C., 283,932, Cl. D32-68.000.
Dobson, William C.; and Cesaroni, William C., 283,933, Cl. D32-68.000.

Decor Corporation Pty., Ltd., The: *See*—
Carlson, Arthur R., 283,880, Cl. D11-164.000.

Delorean Motor Company: *See*—
Giugiaro, Giorgetto, 283,882, Cl. D12-91.000.

de Vos, Hendrik A. J.; and Young, William I., to GTE Products Corporation. Floodlight. 283,926, 5-20-86, Cl. D26-63.000.

Difco Laboratories Incorporated: *See*—
Dyak, Bruce A., 283,921, Cl. D24-52.000.

Dilot, Rolf M., to Tetra Pak International AB. Combined packaging container and attached spoon. 283,873, 5-20-86, Cl. D9-337.000.

Dobson, William C.; and Cesaroni, William C., to Dart Industries Inc. Combined iron and base therefor. 283,932, 5-20-86, Cl. D32-68.000.

Dobson, William C.; and Cesaroni, William C., to Dart Industries Inc. Iron. 283,933, 5-20-86, Cl. D32-68.000.

Dr. Miller's Health Care Products, Inc.: *See*—
Miller, Griffith C., 283,847, Cl. D4-120.000.
Miller, Griffith C., 283,848, Cl. D4-120.000.
Miller, Griffith C., 283,849, Cl. D4-120.000.

Dyak, Bruce A., to Difco Laboratories Incorporated. Blood collector. 283,921, 5-20-86, Cl. D24-52.000.

Edson, Sydney; Miuccio, Salvatore; and Nathan, Howard, to Howard Marlboro Group, Inc., The. Display stand or similar article. 283,862, 5-20-86, Cl. D6-473.000.

Ekco Housewares, Inc.: *See*—
Kelly, Roger L., 283,868, Cl. D7-74.000.

Elmaleh, Jonathan. Tiltable stool. 283,856, 5-20-86, Cl. D6-349.000.

Erfurth, Ronald. Wheeled walker. 283,884, 5-20-86, Cl. D12-130.000.

Evans, Douglas B.; and Symonds, Robert G. Alternator stand. 283,896, 5-20-86, Cl. D15-5.000.

Faciane, Lucille. Combined clock dial and hands. 283,877, 5-20-86, Cl. D10-126.000.

Fawn Engineering Corporation: *See*—
Albright, Henry J., 283,903, Cl. D20-4.000.

Fontannaz, Marcel. Clock with golf club. 283,874, 5-20-86, Cl. D10-6.000.

Fujimoto, Kazumi, to Sony Corporation. Floppy disc. 283,893, 5-20-86, Cl. D14-114.000.

Fukuda, Harumi: *See*—
Kosako, Mikio; Nishibori, Hiroshi; Osaka, Kazumi; and Fukuda, Harumi, 283,915, Cl. D24-21.000.

Garner, Cecil B. Mouthpiece for breath testing equipment. 283,914, 5-20-86, Cl. D24-17.000.

Genaro, Donald M.: *See*—
Britz, David M.; Genaro, Donald M.; McGarvey, John N.; and Zambelli, Michael P., 283,890, Cl. D14-55.000.

General Motors Corporation: *See*—
LeBlanc, Richard S., 283,881, Cl. D12-12.000.

Gissing Enterprises Inc.: *See*—
Chen, Sam, 283,920, Cl. D24-47.000.

Giugiaro, Giorgetto, to Delorean Motor Company. Automobile. 283,882, 5-20-86, Cl. D12-91.000.

Goertz, Albrecht, to Rolodex Corporation. Closed portable card file. 283,902, 5-20-86, Cl. D19-76.000.

Gordon's Inc.: *See*—
Bergelin, Christopher S., 283,863, Cl. D6-477.000.
Bergelin, Christopher S., 283,864, Cl. D6-484.000.
Bergelin, Christopher S., 283,865, Cl. D6-484.000.

Grimes, Gary E., to Timex Computer Corporation. ROM cartridge keypad for personal computer. 283,895, 5-20-86, Cl. D14-114.000.

GTE Products Corporation: *See*—
de Vos, Hendrik A. J.; and Young, William I., 283,926, Cl. D26-63.000.

Gubser, Mark S.; Janczy, John R.; Mohr, Robert G.; and Prohaska, William F., to AT&T Information Systems Inc. Door for a data processor or the like. 283,894, 5-20-86, Cl. D14-114.000.

Henrickson, Robert L. Precious, semiprecious or synthetic cut stone. 283,878, 5-20-86, Cl. D11-90.000.

Henry, Susanne G.; Tsunemura, Kazuo; and Iha, Kiyoshi, to Chamberlain Manufacturing Corporation. Combined garage door and opener. 283,923, 5-20-86, Cl. D25-49.000.

Hollerith, Richard, Jr.; and Schneider, Helmut A., to Ziyad, Inc. Integrated feeder printer. 283,900, 5-20-86, Cl. D18-13.000.

Hollister Incorporated: *See*—
Petersen, William L., 283,922, Cl. D24-54.000.

Hoover, Robert J. Fishing rod holder. 283,909, 5-20-86, Cl. D22-13.000.

Hornick, Louis, II; and Hornick, Morton, to Louis Hornick & Co. Fabric. 283,936, 5-20-86, Cl. D47-6.00R.

Hornick, Morton: *See*—
Hornick, Louis, II; and Hornick, Morton, 283,936, Cl. D47-6.00R.

Horntrich, Gunter, to Kreuzer Produktion and Vertrieb GmbH. Writing instrument. 283,901, 5-20-86, Cl. D19-50.000.

Howard Marlboro Group, Inc., The: *See*—
Edson, Sydney; Miuccio, Salvatore; and Nathan, Howard, 283,862, Cl. D6-473.000.

Hsu, Jason C. Hairbrush. 283,852, 5-20-86, Cl. D4-136.000.

Iha, Kiyoshi: *See*—
Henry, Susanne G.; Tsunemura, Kazuo; and Iha, Kiyoshi, 283,923, Cl. D25-49.000.

Industrial Machine Specialties, Inc.: *See*—
Wessel, Elmer A., 283,846, Cl. D3-36.000.

Interlego AG: *See*—
Nielsen, Jacob, 283,906, Cl. D21-178.000.

Jacobson, Harold. Flexible catheter tube flushing clamp. 283,918, 5-20-86, Cl. D24-27.000.

Janczy, John R.: *See*—
Gubser, Mark S.; Janczy, John R.; Mohr, Robert G.; and Prohaska, William F., 283,894, Cl. D14-114.000.

Jozat, Walter: *See*—
Anderka, Gerold; and Jozat, Walter, 283,907, Cl. D21-212.000.

Kabushikikaisha Aichidenkikosakusho: *See*—
Yamamoto, Osamu; and Norizuki, Senichiro, 283,870, Cl. D8-36.000.

Kane, Earl B.; and Sivy, George. Riding toy. 283,905, 5-20-86, Cl. D21-74.000.

Keene Corporation: *See*—
Sangiamo, Richard; and Russello, Thomas, 283,925, Cl. D26-61.000.

Kelly, Roger L., to Ekco Housewares, Inc. Knife holder. 283,868, 5-20-86, Cl. D7-74.000.

Kersten, Jean: *See*—
Mathias, Jean M.; and Kersten, Jean, 283,919, Cl. D24-34.000.

Kim, Sang Ho. Tire for airplanes. 283,885, 5-20-86, Cl. D12-145.000.

Koch, Adolf, to ATG Autotelle-Grosshandel GmbH. Automobile spoiler. 283,887, 5-20-86, Cl. D12-181.000.

Kosako, Mikio; Nishibori, Hiroshi; Osaka, Kazumi; and Fukuda, Harumi, to Sharp Corporation. Sphygmomanometer. 283,915, 5-20-86, Cl. D24-21.000.

Kreuzer Produktion and Vertrieb GmbH: *See*—
Horntrich, Gunter, 283,901, Cl. D19-50.000.

Kujawski, Stanley M., to Quaker Oats Company, The. Booster seat. 283,855, 5-20-86, Cl. D6-333.000.

LeBlanc, Richard S., to General Motors Corporation. Combined armored vehicle turret and control pit. 283,881, 5-20-86, Cl. D12-12.000.

Lief, Joseph R.; and McCully, Michael D., to Smith, M. Dale. Inflatable insulated carrying container. 283,845, 5-20-86, Cl. D3-30.100.

Lin, Tsai-Kuan: *See*—
Chen, Henry T. H.; Chuang, William W. L.; and Lin, Tsai-Kuan, 283,883, Cl. D12-107.000.

Livieratos, Christos, to Chicago Booth Mfg., Co., Inc. Restaurant booth seat. 283,857, 5-20-86, Cl. D6-364.000.

Long, John A.: *See*—
Moore, Paul C., Jr., 283,917, Cl. D24-25.000.
Louis Hornick & Co.: *See*—
Hornick, Louis, II; and Hornick, Morton, 283,936, Cl. D47-6.00R.
Malamoud, Jean G., to S. T. DuPont. Watchcase. 283,875, 5-20-86, Cl. D10-38.000.
Manton, Terry, to Westwood Lighting Group, Inc. Lamp base. 283,927, 5-20-86, Cl. D26-110.000.
Manton, Terry, to Westwood Lighting Group, Inc. Lamp base. 283,928, 5-20-86, Cl. D26-110.000.
Manton, Terry, to Westwood Lighting Group, Inc. Lamp base. 283,929, 5-20-86, Cl. D26-110.000.
Marshall, David J., to Spotless Plastics Pty. Ltd. Garment hanger. 283,854, 5-20-86, Cl. D6-318.000.
Mathias, Jean M.; and Kersten, Jean, to Baxter Travenol Laboratories, Inc. Disposable swab applicator. 283,919, 5-20-86, Cl. D24-34.000.
Mayfair Super Markets, Inc.: *See*—
Cantolino, Richard, 283,860, Cl. D6-471.000.
Cantolino, Richard, 283,861, Cl. D6-471.000.
McCully, Michael D.: *See*—
Lief, Joseph R.; and McCully, Michael D., 283,845, Cl. D3-30.100.
McGarvey, John N.: *See*—
Britz, David M.; Genaro, Donald M.; McGarvey, John N.; and Zambelli, Michael P., 283,890, Cl. D14-55.000.
Miller, Griffith C., to Dr. Miller's Health Care Products, Inc. Foot scrubber. 283,847, 5-20-86, Cl. D4-120.000.
Miller, Griffith C., to Dr. Miller's Health Care Products, Inc. Foot hygiene brush having a vertically disposed digital brush. 283,848, 5-20-86, Cl. D4-120.000.
Miller, Griffith C., to Dr. Miller's Health Care Products, Inc. Foot hygiene device having a centrally disposed dorsal brush. 283,849, 5-20-86, Cl. D4-120.000.
Miller, Griffith C. Brush for cleaning the ventral and lateral surfaces of a foot. 283,850, 5-20-86, Cl. D4-120.000.
Mitchell, Raymond. Refrigerator. 283,897, 5-20-86, Cl. D15-79.000.
Mitsubishi Denki Kabushiki Kaisha: *See*—
Miyamoto, Akira; and Yamaguchi, Kazuyuki, 283,911, Cl. D23-139.000.
Miyamoto, Akira; and Yamaguchi, Kazuyuki, 283,912, Cl. D23-139.000.
Miuccio, Salvatore: *See*—
Edson, Sydney; Miuccio, Salvatore; and Nathan, Howard, 283,862, Cl. D6-473.000.
Miyamoto, Akira; and Yamaguchi, Kazuyuki, to Mitsubishi Denki Kabushiki Kaisha. Cooling tower. 283,911, 5-20-86, Cl. D23-139.000.
Miyamoto, Akira; and Yamaguchi, Kazuyuki, to Mitsubishi Denki Kabushiki Kaisha. Cooling tower. 283,912, 5-20-86, Cl. D23-139.000.
Mohr, Robert G.: *See*—
Gubser, Mark S.; Janczy, John R.; Mohr, Robert G.; and Prohaska, William F., 283,894, Cl. D14-114.000.
Moore, Paul C., Jr., to Long, John A., a part interest. Insulin syringe injector with auto-aspirator. 283,917, 5-20-86, Cl. D24-25.000.
Motorola, Inc.: *See*—
Claxton, Bruce A.; and Althans, Richard K., 283,888, Cl. D13-8.000.
Nathan, Howard: *See*—
Edson, Sydney; Miuccio, Salvatore; and Nathan, Howard, 283,862, Cl. D6-473.000.
Nielsen, Jacob, to Interlego AG. Toy sailor figure. 283,906, 5-20-86, Cl. D21-178.000.
Nishibori, Hiroshi: *See*—
Kosako, Mikio; Nishibori, Hiroshi; Osaka, Kazumi; and Fukuda, Harumi, 283,915, Cl. D24-21.000.
Norizuki, Senichiro: *See*—
Yamamoto, Osamu; and Norizuki, Senichiro, 283,870, Cl. D8-36.000.
North American Philips Corporation: *See*—
Tsuji, Masao, 283,934, Cl. D32-69.000.
Opsvik, Peter. Chair. 283,858, 5-20-86, Cl. D6-366.000.
ORS Corporation: *See*—
Prinzhorn, Ernest F. J., 283,937, Cl. D99-28.000.
Osaka, Kazumi: *See*—
Kosako, Mikio; Nishibori, Hiroshi; Osaka, Kazumi; and Fukuda, Harumi, 283,915, Cl. D24-21.000.
Padgett, La Verne. Wine bottle display rack. 283,859, 5-20-86, Cl. D6-463.000.
Parshad, David; and Botros, Radamis, to Darome, Inc. Teleconferencing microphone. 283,891, 5-20-86, Cl. D14-59.000.
Peavey Electronics Corporation: *See*—
Peavey, Hartley D., 283,899, Cl. D17-20.000.
Peavey, Hartley D., to Peavey Electronics Corporation. Guitar body or similar article. 283,899, 5-20-86, Cl. D17-20.000.
Petersen, William L., to Hollister Incorporated. Strap for closing urine collection pouches. 283,922, 5-20-86, Cl. D24-54.000.
Power Plus Products, Inc.: *See*—
Ziomek, Joseph F., 283,908, Cl. D21-230.000.
Practical Products Mfy, Ltd: *See*—
Yau, Andrew, 283,924, Cl. D26-49.000.
Prinzhorn, Ernest F. J., to ORS Corporation. Automated teller service center enclosure. 283,937, 5-20-86, Cl. D99-28.000.
Prohaska, William F.: *See*—
Gubser, Mark S.; Janczy, John R.; Mohr, Robert G.; and Prohaska, William F., 283,894, Cl. D14-114.000.
Quaker Oats Company, The: *See*—
Cutler, Gordon L., 283,892, Cl. D14-68.000.
Kujawski, Stanley M., 283,855, Cl. D6-333.000.
Rolodex Corporation: *See*—
Goertz, Albrecht, 283,902, Cl. D19-76.000.
Russello, Thomas: *See*—
Sangiamo, Richard; and Russello, Thomas, 283,925, Cl. D26-61.000.
S. T. DuPont: *See*—
Malamoud, Jean G., 283,875, Cl. D10-38.000.
Saad, Michael H.; Wunder, Herbert; and Saad, William M. Money clip. 283,844, 5-20-86, Cl. D2-430.000.
Saad, William M.: *See*—
Saad, Michael H.; Wunder, Herbert; and Saad, William M., 283,844, Cl. D2-430.000.
Saliba, Michael. Dashboard mounted token dispenser or the like. 283,939, 5-20-86, Cl. D99-34.000.
Sangiamo, Richard; and Russello, Thomas, to Keene Corporation. High intensity discharge light fixture. 283,925, 5-20-86, Cl. D26-61.000.
Scherer, Bernard, to Villeroy & Boch S.a.r.l. Dinner plate or the like. 283,867, 5-20-86, Cl. D7-36.000.
Schneider, Helmut A.: *See*—
Hollerith, Richard, Jr.; and Schneider, Helmut A., 283,900, Cl. D18-13.000.
Scott, Blayney J., to Scott Plastics Ltd. Downrigger. 283,910, 5-20-86, Cl. D22-26.000.
Scott Plastics Ltd.: *See*—
Scott, Blayney J., 283,910, Cl. D22-26.000.
Sharp Corporation: *See*—
Akiyama, Kunio, 283,916, Cl. D24-21.000.
Kosako, Mikio; Nishibori, Hiroshi; Osaka, Kazumi; and Fukuda, Harumi, 283,915, Cl. D24-21.000.
Sivy, George: *See*—
Kane, Earl B.; and Sivy, George, 283,905, Cl. D21-74.000.
Smith, M. Dale: *See*—
Lief, Joseph R.; and McCully, Michael D., 283,845, Cl. D3-30.100.
SmithKline Beckman Corporation: *See*—
Baum, Ronald L., 283,931, Cl. D28-2.000.
Sony Corporation: *See*—
Fujimoto, Kazumi, 283,893, Cl. D14-114.000.
Spotless Plastics Pty. Ltd.: *See*—
Marshall, David J., 283,854, Cl. D6-318.000.
Steinbeck, Jay. Cordless telephone. 283,889, 5-20-86, Cl. D14-53.000.
Strongwater, Murray. Coin holder. 283,938, 5-20-86, Cl. D99-34.000.
Symonds, Robert G.: *See*—
Evans, Douglas B.; and Symonds, Robert G., 283,896, Cl. D15-5.000.
Tabach, Julius I. Liquid level alarm. 283,876, 5-20-86, Cl. D10-106.000.
Tanaka Mfg. Co. Ltd.: *See*—
Tanaka, Yoshihisa, 283,930, Cl. D27-48.000.
Tanaka, Yoshihisa, to Tanaka Mfg. Co. Ltd. Cigarette holder for vehicles. 283,930, 5-20-86, Cl. D27-48.000.
Tetra Pak International AB: *See*—
Dilot, Rolf M., 283,873, Cl. D9-337.000.
Timex Computer Corporation: *See*—
Grimes, Gary E., 283,895, Cl. D14-114.000.
Tomlinson, Robert. Fan mount. 283,913, 5-20-86, Cl. D23-163.000.
Trapp, Christopher S. Pivotally mounted motorcycle hand lever. 283,886, 5-20-86, Cl. D12-179.000.
Tsuji, Masao, to North American Philips Corporation. Travel iron. 283,934, 5-20-86, Cl. D32-69.000.
Tsunemura, Kazuo: *See*—
Henry, Susanne G.; Tsunemura, Kazuo; and Iha, Kiyoshi, 283,923, Cl. D25-49.000.
Villeroy & Boch S.a.r.l.: *See*—
Scherer, Bernard, 283,867, Cl. D7-36.000.
Walko, Stephen J., to Crystal Leisure, Inc. Pool table brush. 283,851, 5-20-86, Cl. D4-130.000.
Wessel, Elmer A., to Industrial Machine Specialties, Inc. Softball equipment caddy or similar article. 283,846, 5-20-86, Cl. D3-36.000.
Westwood Lighting Group, Inc.: *See*—
Manton, Terry, 283,927, Cl. D26-110.000.
Manton, Terry, 283,928, Cl. D26-110.000.
Manton, Terry, 283,929, Cl. D26-110.000.
Wistrand, John, to Clairol Incorporated. Lighted mirror. 283,853, 5-20-86, Cl. D6-308.000.
Wunder, Herbert: *See*—
Saad, Michael H.; Wunder, Herbert; and Saad, William M., 283,844, Cl. D2-430.000.
Yamaguchi, Kazuyuki: *See*—
Miyamoto, Akira; and Yamaguchi, Kazuyuki, 283,911, Cl. D23-139.000.
Miyamoto, Akira; and Yamaguchi, Kazuyuki, 283,912, Cl. D23-139.000.
Yamamoto, Osamu; and Norizuki, Senichiro, to Kabushikikaisha Aichidenkikosakusho. Electric can opener. 283,870, 5-20-86, Cl. D8-36.000.
Yau, Andrew, to Practical Products Mfy, Ltd. Flashlight. 283,924, 5-20-86, Cl. D26-49.000.
Young, William I.: *See*—
de Vos, Hendrik A. J.; and Young, William I., 283,926, Cl. D26-63.000.
Zambelli, Michael P.: *See*—
Britz, David M.; Genaro, Donald M.; McGarvey, John N.; and Zambelli, Michael P., 283,890, Cl. D14-55.000.
Ziomek, Joseph F., to Power Plus Products, Inc. Water ski handle. 283,908, 5-20-86, Cl. D21-230.000.
Ziyad, Inc.: *See*—
Hollerith, Richard, Jr.; and Schneider, Helmut A., 283,900, Cl. D18-13.000.

CLASSIFICATION OF PATENTS

ISSUED MAY 20, 1986

NOTE—First number, class; second number, subclass; third number, patent number

CLASS 2

161 A 4,589,146

CLASS 4

236 4,589,148
242 4,589,149
656 4,589,150

CLASS 5

66 4,589,151
164 R 4,589,152

CLASS 7

169 4,589,153

CLASS 8

481 4,589,884
527 4,589,885

CLASS 10

7 4,589,154
86 A 4,589,155

CLASS 14

4 4,589,156
73 4,589,157

CLASS 15

21 D 4,589,158
167 R 4,589,159
316 R 4,589,160
372 4,589,161

CLASS 16

115 4,589,162
124 4,589,163
299 4,589,164

CLASS 17

11 4,589,165

CLASS 19

82 4,589,166
106 R 4,589,167
240 4,589,168
304 4,589,169

CLASS 24

456 4,589,170
543 4,589,171
602 4,589,172

CLASS 28

269 4,589,173

CLASS 29

33 R 4,589,174
156.8 B 4,589,175
4,589,176
159.1 4,589,177
179 4,589,886
240 4,589,178
256 4,589,179
263 4,589,180
401.1 4,589,181
410 4,589,182
426.5 4,589,183
430 4,589,184
432 4,589,185
434 4,589,186
458 4,589,187
566.2 4,589,188
571 4,589,189
4,589,190
572 4,589,191
4,589,192
576 W 4,589,193
583 4,589,194
588 4,589,195
591 4,589,196
623.1 4,589,197
709 4,589,198
714 4,589,199
753 4,589,200
764 4,589,201
822 4,589,202
829 4,589,203

CLASS 30

43.8 4,589,205
114 4,589,206
287 4,589,207
324 4,589,204
376 4,589,208
478 4,589,209

CLASS 33

27.03 4,589,210
189 4,589,211
190 4,589,212
371 4,589,213
531 4,589,214

CLASS 34

182 4,589,215

CLASS 36

32 R 4,589,216

CLASS 42

50 4,589,218
73 4,589,219
90 4,589,220

CLASS 43

17.6 4,589,221
42.23 4,589,222
42.24 4,589,223

CLASS 44

16 R 4,589,887

CLASS 47

1 R 4,589,224
58 4,589,225
4,589,226

CLASS 49

227 4,589,227
386 4,589,228
505 4,589,229

CLASS 51

95 GH 4,589,230
124 L 4,589,231
168 4,589,232
399 4,589,233
417 4,589,234

CLASS 52

28 4,589,235
81 4,589,236
169.7 4,589,237
200 4,589,238
4,589,239
309.11 4,589,240
315 4,589,241
396 4,589,242
403 4,589,243
685 4,589,244

CLASS 53

248 4,589,245
491 4,589,246
550 4,589,247

CLASS 54

24 4,589,248

CLASS 55

26 4,589,888
48 4,589,889
59 4,589,890
158 4,589,891
162 4,589,892
269 4,589,893
274 4,589,894
357 4,589,895

CLASS 56

16.6 4,589,249
126 4,589,250
202 4,589,251
255 4,589,252
327 R B1 4,335,570

CLASS 58

332 4,590,012

CLASS 60

204 4,589,253
286 4,589,254
646 4,589,255
660 4,589,256
670 4,589,257
679 4,589,258
698 4,589,259
737 4,589,260

CLASS 62

28 4,589,896
73 4,589,261
141 4,589,262
193 4,589,263
374 4,589,264
526 4,589,265

CLASS 65

2 4,589,897
12 4,589,898
33 4,589,899
4,589,900
107 4,589,901
252 4,589,902

CLASS 66

12 4,589,266
4,589,267

CLASS 71

9 4,589,903
61 4,589,904
66 4,589,905
80 4,589,906
86 4,589,907
88 4,589,908
90 4,589,909
4,589,910
91 4,589,911
93 4,589,912
4,589,913
103 4,589,914

CLASS 72

8 4,589,268
247 4,589,269
348 4,589,270
449 4,589,271
453.16 4,589,272

CLASS 73

11 4,589,273
29 4,589,274
40.5 R 4,589,275
60.1 4,589,276
61.1 R 4,589,277
117.3 4,589,278
118 4,589,279
226 4,589,280
290 R 4,589,281
313 4,589,282
432 R 4,589,283
626 4,589,284
655 4,589,285
715 4,589,286
727 4,589,287
852 4,589,288
862.23 4,589,289
862.36 4,589,290
862.65 4,589,291
863.03 4,589,292

CLASS 74

15.6 4,589,293
331 4,589,294
360 4,589,295
411 4,589,296
427 4,589,297
441 4,589,298
458 4,589,299
462 4,589,300
586 4,589,301
689 4,589,303
701 4,589,304
866 4,589,302

CLASS 75

53 4,589,915
126 R 4,589,916
238 4,589,917
244 4,589,918
251 4,589,919

CLASS 76

107 R 4,589,305
112 4,589,306

CLASS 81

62 4,589,307
177.85 4,589,308

CLASS 82

1.2 4,589,309
1.4 4,589,310
2.5 4,589,311
47 4,589,312
63 4,589,313

CLASS 83

144 4,589,314
202 4,589,315
289 4,589,316
400 4,589,317
409.1 4,589,318
423 4,589,319
794 4,589,320

CLASS 84

297 R 4,589,321
402 4,589,322
411 R 4,589,323
454 4,589,324

CLASS 89

33.02 4,589,325
145 4,589,326
148 4,589,327

CLASS 91

498 4,589,328

CLASS 92

72 4,589,329

CLASS 98

31 4,589,330
39.1 4,589,331
55 4,589,332

CLASS 99

419 4,589,333
534 4,589,334

CLASS 101

114 4,589,335
124 4,589,336
216 4,589,338
217 4,589,339
363 4,589,337

CLASS 102

293 4,589,340
303 4,589,341
377 4,589,342

CLASS 104

7 B 4,589,343
24 4,589,344

CLASS 105

170 4,589,345
171 4,589,346
224.1 4,589,347
228 4,589,348

CLASS 106

30 4,589,920
288 Q 4,589,921
308 Q 4,589,922

CLASS 108

102 4,589,349
111 4,589,350
4,589,351

CLASS 110

216 4,589,352
244 4,589,353
246 4,589,354
346 4,589,355
347 4,589,356
4,589,357

CLASS 112

68 4,589,358
121.11 4,589,360
121.12 4,589,359
262.3 4,589,361
292 4,589,362
308 4,589,363
311 4,589,364

CLASS 114

347 4,589,365
363 4,589,366

CLASS 118

66 4,589,367
258 4,589,368
300 4,589,369

CLASS 119

4 4,589,370
48 4,589,371
51 R 4,589,372
72.5 4,589,373

CLASS 122

14 4,589,374
504 4,589,375

CLASS 123

25 C 4,589,377
25 L 4,589,376
41.02 4,589,378
41.49 4,589,379
46 R 4,589,380
52 M 4,589,381
90.31 4,589,382
90.36 4,589,383
90.55 4,589,384
179 F 4,589,385
187.5 R 4,589,386
198 F 4,589,387
241 4,589,388
326 4,589,389
339 4,589,390
357 4,589,391
4,589,392
460 4,589,393
479 4,589,401
502 4,589,394
516 4,589,395
559 4,589,396
590 4,589,397
596 4,589,398

CLASS 126

30 4,589,399
440 4,589,400

CLASS 127

4 4,589,923
37 4,589,924

CLASS 128

1 R 4,589,402
4 4,589,403
6 4,589,404
79 4,589,405
87 R 4,589,406
4,589,407
132 R 4,589,408
203.26 4,589,409
207.15 4,589,410
303.14 4,589,411
305 4,589,412
4,589,413
4,589,414
328 4,589,415
334 C 4,589,416
422 4,589,417
635 4,589,418
663 4,589,419
702 4,589,420
763 4,589,421
804 4,589,422
4,589,423
4,589,424

CLASS 130

27 HF 4,589,425

CLASS 131

84.3 4,589,426
181 4,589,427
297 4,589,428

CLASS 132

79 R 4,589,429
82 D 4,589,430
83 R 4,589,431
88.7 4,589,432

CLASS 133

5 R 4,589,433

CLASS 134

3 4,589,925
6 4,589,926
25.1 4,589,927

CLASS 136

233 4,590,326
256 4,590,327

CLASS 137

1 4,589,434
102 4,589,435
115 4,589,436
117 4,589,437
218 4,589,438
219 4,589,439
486 4,589,440
512 4,589,441
546 4,589,442
588 4,589,443
613 4,589,444
616.7 4,589,445

CLASS 138

97 4,589,446
98 4,589,447
122 4,589,448
162 4,589,449

CLASS 139

54 4,589,450
452 4,589,451

CLASS 141

3 4,589,452
39 4,589,453
68 4,589,454
311 R 4,589,455

CLASS 144

3 P 4,589,456
193 E 4,589,457
238 4,589,458

CLASS 148

1.5 4,589,928
6.3 4,589,929
11.5 C 4,589,930
12 C 4,589,931
12.7 A 4,589,932
143 4,589,933
145 4,589,934
147 4,589,935
188 4,589,936
404 4,589,937
435 4,589,938

CLASS 150

52 K 4,589,459

CLASS 152

170 4,589,460
209 R 4,589,461

CLASS 156

49 4,589,939
78 4,589,940
140 4,589,941
148 4,589,942
256 4,589,943
359 4,589,944
497 4,589,945
513 4,589,946
521 4,589,947
555 4,589,948
568 4,589,949
578 4,589,950
617 R 4,589,951
628 4,589,952
645 4,589,953

CLASS 157

1.17 4,589,462

CLASS 160

88 4,589,463
91 4,589,464

CLASS 162

138 4,589,954

CLASS 164

66.1 4,589,465
119 4,589,466
326 4,589,467
418 4,589,468
460 4,589,469
463 4,589,470
4,589,471
472 4,589,472

CLASS 165

1 4,589,473
9.1 4,589,474
35 4,589,475
54 4,589,476
66 4,589,477
76 4,589,478
104.12 4,589,479
146 4,589,480
172 4,589,481

CLASS 166

105.5 4,589,482
176 4,589,483
179 4,589,484
250 4,589,485
252 4,589,486
261 4,589,487
270 4,589,488
274 4,589,489
276 4,589,490
302 4,589,491
338 4,589,492
341 4,589,493
372 4,589,494
383 4,589,495

CLASS 169

20 4,589,496

CLASS 172

707 4,589,497
719 4,589,498

CLASS 173

22 4,589,499
90 4,589,500
131 4,589,501

CLASS 174

88 R 4,590,328
4,590,329

CLASS 175

102 4,589,502
113 4,589,503
267 4,589,504

CLASS 177

2 4,589,505
25 4,589,506
138 4,589,507

CLASS 178

4 4,590,330

CLASS 179

5 R 4,590,331
115.5 PS 4,590,332
4,590,333
170 D 4,590,334
175 4,590,335
175.3 A 4,590,336
186 4,590,337

CLASS 180

19.1 4,589,508
74 4,589,509
140 4,589,510
197 4,589,511
229 4,589,512
287 4,589,513
289 4,589,514

CLASS 181

227 4,589,515
256 4,589,516
265 4,589,517

CLASS 182

2 4,589,518
48 4,589,519
63 4,589,520
129 4,589,521
187 4,589,522
234 4,589,523

CLASS 184

103.1 4,589,524

CLASS 188

2 F 4,589,525
74 4,589,526
79.5 GE 4,589,527
279 4,589,528
322.17 4,589,529

CLASS 190

18 A 4,589,530

CLASS 192

0.03 4,589,532
0.052 4,589,537
2 4,589,531
18 A 4,589,533
18 B 4,589,534
35 4,589,536
70.12 4,589,535

CLASS 194

205 4,589,538

CLASS 196

114 4,589,955

CLASS 198

331 4,589,539
345 4,589,540
468.4 4,589,541
782 4,589,542
834 4,589,543

CLASS 200

5 R 4,590,338
6 A 4,590,339
61.54 4,590,340
4,590,341
159 B 4,590,342
282 4,590,343
291 4,590,344
331 4,590,345

CLASS 202

170 4,589,956

CLASS 203

75 4,589,957

CLASS 204

1 T 4,589,958
15 4,589,961
4,589,962
28 4,589,959
29 4,589,972
37.1 4,589,960
72 4,589,963
182.8 4,589,965
228 4,589,966
243 R 4,589,967
257 4,589,968
290 F 4,589,969
406 4,589,970
430 4,589,971

CLASS 206

45 4,589,544
264 4,589,545
315.11 4,589,546
328 4,589,547
363 4,589,548
387 4,589,549
443 4,589,550
456 4,589,551
492 4,589,552
525 4,589,553

CLASS 208

22 4,589,974
44 4,589,975
89 B1 4,456,527
111 4,589,976
4,589,977
113 4,589,978
263 4,589,979
410 4,589,973

CLASS 209

166 4,589,980
474 4,589,981
546 4,589,554
703 4,589,555

CLASS 210

169 4,589,982
317 4,589,983
483 4,589,986
522 4,589,984
699 4,589,985
725 4,589,987

CLASS 211

41 4,589,556
94 4,589,557

CLASS 213

50 4,589,558

CLASS 215

1 C 4,589,559
4,589,560
256 4,589,561

CLASS 219

10.43 4,590,346
10.49 R 4,590,347
10.55 B 4,590,350
10.55 E 4,590,349
10.55 F 4,590,351
10.55 M 4,590,348
69 C 4,590,353
69 M 4,590,352
121 PM 4,590,354
124.34 4,590,356
125.12 4,590,355
130.1 4,590,357
136 4,590,358
217 4,590,359
390 4,590,360
439 4,590,361
497 4,590,362
4,590,363

CLASS 220

3 4,589,562
4,589,563
4,589,564
5 R 4,589,643
71 4,589,565
316 4,589,566
326 4,589,567
359 4,589,568
380 4,589,569
404 4,589,570

CLASS 221

75 4,589,571
198 4,589,575

CLASS 222

83.5 4,589,572
153 4,589,573
4,589,574
357 4,589,576
518 4,589,577
529 4,589,578
561 4,589,579

CLASS 226

119 4,589,580

CLASS 227

7 4,589,581
19 4,589,582
43 4,589,583

CLASS 228

110 4,589,584
119 4,589,585
179 4,589,586
183 4,589,587

CLASS 229

41 R 4,589,588
48 SA 4,589,591
52 B 4,589,589
92.8 4,589,590

CLASS 232

43.1 4,589,592

CLASS 235

98 C 4,590,364
379 4,590,365
494 4,590,366

CLASS 236

94 4,589,593

CLASS 239

265.25 4,589,594
271 4,589,595
397.5 4,589,596
703 4,589,597

CLASS 241

37 4,589,598
37.5 4,589,599
215 4,589,600

CLASS 242

1 4,589,601
35.5 R 4,589,602
55 4,589,605
59 4,589,603
71.6 4,589,604
76 4,589,606
180 4,589,607
195 4,589,608
198 4,589,609

CLASS 244

3.19 4,589,610
6 4,589,611
118.6 4,589,612
129.5 4,589,613
136 4,589,614
137 R 4,589,615
180 4,589,616

CLASS 246

388 4,589,617

CLASS 248

68.1 4,589,618
174 4,589,619
550 4,589,620
586 4,589,621
649 4,589,622

CLASS 249

83 4,589,623
177 4,589,624

CLASS 250

205 4,590,367
207 4,590,368
252.1 4,590,369
267 4,590,370
289 4,590,371
304 4,590,372
308 4,590,373
348 4,590,374
358.1 4,590,375
361 R 4,590,376
363 S 4,590,377
396 R 4,590,378
442.1 4,590,379
484.1 4,590,380
491.1 4,590,381
506.1 4,590,382
4,590,383

CLASS 251

1.3 4,589,625
10 4,589,626
25 4,589,627
214 4,589,628
288 4,589,629

CLASS 252

8.75 4,589,989
8.8 4,589,988
47 4,589,991
56 S 4,589,990
75 4,589,992
78.5 4,589,993
107 4,589,994
180 4,589,995
299.65 4,589,996
313.1 4,589,997
330 4,589,998
511 4,589,999
633 4,590,000

CLASS 254

7 B 4,589,630
28 4,589,631
418 4,589,632

CLASS 260

112 R B1 3,850,798
239.3 R 4,590,005
393 4,590,006
409 4,590,007
502.4 R 4,590,014
544 F 4,590,015
4,590,016

CLASS 264

2.1 4,590,018
3.4 4,590,019
22 4,590,020
25 4,590,021
41 4,590,022
46.5 4,590,023
81 4,590,024
103 4,590,025
135 4,590,027
154 4,590,028
156 4,590,029
221 4,590,026
331.19 4,590,030
338 4,590,031
555 4,590,032

CLASS 266

44 4,589,633
215 4,589,634
220 4,589,635
234 4,589,637
271 4,589,636

CLASS 267

8 R 4,589,638
150 4,589,639

CLASS 269

2 4,589,640
289 R 4,589,641
325 4,589,642

CLASS 270

31 4,589,644

CLASS 271

3.1 4,589,645
4 4,589,646
94 4,589,647
106 4,589,648
107 4,589,649
242 4,589,650
245 4,589,651
4,589,652
293 4,589,653
314 4,589,654

CLASS 272

67 4,589,655
73 4,589,656
85 4,589,657
128 Re.32,150
134 4,589,658

CLASS 273

1 GA 4,589,660
1 GC 4,589,659
32.5 4,589,661
73 D 4,589,662
155 4,589,663
258 4,589,664

CLASS 277

1 4,589,665
200 4,589,666

CLASS 279

2 A 4,589,667

CLASS 280

8 4,589,668
43.12 4,589,669
405 R 4,589,670
433 4,589,671
478 B 4,589,672
630 4,589,673
633 4,589,674
707 4,589,675
4,589,676
726 4,589,677
772 4,589,678
777 4,589,679
801 4,589,680
819 4,589,681

CLASS 281

46 4,589,682

CLASS 282

11.5 A 4,589,683

CLASS 283

81 4,589,685
85 4,589,686
94 4,589,687

CLASS 285

12 4,589,688
24 4,589,689
162 4,589,690
319 4,589,684

CLASS 290

4 C 4,590,384
38 E 4,590,385
54 4,590,386

CLASS 292

165 4,589,691
297 4,589,692
315 4,589,693

CLASS 296

213 4,589,694

CLASS 297

284 4,589,695
4,589,696
300 4,589,697
410 4,589,698
423 4,589,699

CLASS 299

18 4,589,700
72 4,589,701

CLASS 301

63 PW 4,589,702

CLASS 303

6 M 4,589,704
6 R 4,589,703
36 4,589,705
114 4,589,706

CLASS 307

64 4,590,387
202.1 4,590,388
303 4,590,389
311 4,590,390
355 4,590,391
446 4,590,392
471 4,590,393
549 4,590,394
570 4,590,395
572 4,590,396

CLASS 308

10 4,589,707

CLASS 310

71 4,590,397
239 4,590,398
334 4,590,399
338 4,590,400

CLASS 312

71 4,589,708
236 4,589,712
257 A 4,589,709
330 R 4,589,710
4,589,711

CLASS 313

93 4,590,401
414 4,590,402
4,590,403
477 R 4,590,404
486 4,590,405

CLASS 315

80 4,590,406
208 4,590,407
403 4,590,408

CLASS 318

139 4,590,409
371 B1 4,074,176
480 4,590,410
687 4,590,411
696 4,590,412
803 4,590,413

CLASS 320

64 4,590,414
4,590,415

CLASS 323

205 4,590,416
229 4,590,417
313 4,590,418
4,590,419

CLASS 324

54 4,590,420
62 4,590,421
158 F 4,590,422
4,590,423
204 4,590,424
244 4,590,425
248 4,590,426
318 4,590,427
320 4,590,428
414 4,590,429
427 4,590,430
443 4,590,431

CLASS 328

164 4,590,432

CLASS 329

50 4,590,433

CLASS 330

102 4,590,434
258 4,590,435
277 4,590,436
4,590,437
300 4,590,438

CLASS 331

1 A 4,590,439
17 4,590,440
107 A 4,590,442
107 DP 4,590,441
111 4,590,444
117 R 4,590,443

CLASS 332

18 4,590,445

CLASS 333

125 4,590,446
156 4,590,447
205 4,590,448

CLASS 335

126 4,590,449
129 4,590,450
161 4,590,451
301 4,590,452

CLASS 336

180 4,590,453

CLASS 338

128 4,590,454

CLASS 339

7 4,589,713
14 R 4,589,714
17 F 4,589,715
91 R 4,589,716
94 M 4,589,717
95 D 4,589,718
126 R 4,589,719
147 R 4,589,720
210 R 4,589,721
272 UC 4,589,722

CLASS 340

347 AD 4,590,458
4,590,459
347 DA 4,590,456
4,590,457
347 P 4,590,469
541 4,590,460
572 4,590,461
605 4,590,462
703 4,590,463

711 4,590,464
723 4,590,465
825.31 4,590,470
825.5 4,590,467
4,590,468
825.52 4,590,473
825.69 4,590,471
870.04 4,590,472
870.28 4,590,466
907 4,590,455
944 4,590,474
966 4,590,475

CLASS 343

7.4 4,590,476
17.7 4,590,477
700 MS 4,590,478
771 4,590,479
4,590,480
840 4,590,481

CLASS 346

1.1 4,590,482
4,590,483
76 PH 4,590,484
4,590,485
4,590,486
4,590,487
4,590,488
4,590,489
4,590,490
4,590,491
107 R 4,590,492
135.1 4,590,493
140 R 4,590,494
4,590,495
153.1 4,590,496
201 4,590,497
208 4,590,498
209 4,590,499
4,590,500

CLASS 350

3.83 4,589,723
96.15 4,589,724
4,589,725
96.20 4,589,726
4,589,727
96.30 4,589,728
96.32 4,589,729
267 4,589,730
319 4,589,731
331 R 4,589,732
332 4,589,733
336 4,589,734
338 4,589,735
356 4,589,737
413 4,589,736
443 4,589,738
452 4,589,739
487 4,589,740
532 4,589,741
536 4,589,743
566 4,589,744
589 4,589,742

CLASS 354

4 4,589,745
4,589,746
149.11 4,589,747
195.12 4,589,748
221 4,589,749
271.1 4,589,750
295 4,589,751
303 4,589,752
400 4,589,753
431 4,589,754
4,589,755
432 4,589,756
458 4,589,757

CLASS 355

3 FU 4,589,758
3 SH 4,589,765
8 4,589,759
4,589,760
4,589,761
14 D 4,589,762
14 R 4,589,763
4,589,764
38 4,589,766
45 4,589,767
50 4,589,768
71 4,589,769

CLASS 356

1 4,589,770
38 4,589,771
353 4,589,772
367 4,589,776
371 4,589,773
436 4,589,774
439 4,589,775

CLASS 357

17 4,590,501
22 4,590,502
23.11 4,590,504
23.5 4,590,503
24 4,590,505
4,590,506
28 4,590,507
41 4,590,508
53 4,590,509

CLASS 358

19 4,590,510
21 R 4,590,511
29 4,590,512
31 4,590,513
75 4,590,514
4,590,515
86 4,590,516
111 4,590,517
4,590,518
120 4,590,519
163 4,590,520
261 4,590,521
321 4,590,522

CLASS 360

10.3 4,590,523
47 4,590,531
65 4,590,524
66 4,590,525
78 4,590,526
4,590,527
94 4,590,528
106 4,590,529
122 4,590,530
133 4,590,532

CLASS 361

91 4,590,533
212 4,590,534
218 4,590,535
253 4,590,536
306 4,590,537
385 4,590,538
400 4,590,539
4,590,540
433 4,590,541

CLASS 362

61 4,590,542
183 4,590,543
368 4,590,544
392 4,590,545

CLASS 363

18 Re.32,155
37 4,590,546
127 4,590,547
161 4,590,548

CLASS 364

131 4,590,549
200 4,590,550
4,590,551
4,590,552
4,590,553
4,590,554
4,590,555
4,590,556
4,590,557
414 4,590,558
4,590,559
419 4,590,560
424.1 4,590,561
431.02 4,590,562
431.05 4,590,563
431.06 Re.32,156
431.07 4,590,564
431.08 4,590,565
431.11 4,590,566
434 4,590,567
442 4,590,568
452 4,590,569
4,590,570
467 4,590,571
474 4,590,572
4,590,573
498 4,590,574
509 4,590,575
510 4,590,576
513 4,590,577
4,590,578
558 4,590,579
571 4,590,580
578 4,590,581
724 4,590,582
4,590,583
748 4,590,584
900 4,590,585
4,590,586

CLASS 365

1 4,590,587
51 4,590,588
100 4,590,589

CLASS 366

160 4,589,777
316 4,589,778

CLASS 367

4 4,590,590
6 4,590,591
68 4,590,592
83 4,590,593

CLASS 368

74 4,589,779
245 4,589,780

CLASS 369

45 4,590,594

CLASS 370

76 4,590,595

CLASS 372

2 4,590,596
32 4,590,597
38 4,590,598
87 4,590,599

CLASS 374

14 4,589,782
29 4,589,781
45 4,589,783

CLASS 375

99 4,590,600
115 4,590,601
120 4,590,602

CLASS 378

108 4,590,603

CLASS 381

42 4,590,604
43 4,590,605

CLASS 382

7 4,590,606
41 4,590,607
43 4,590,608
50 4,590,609

CLASS 383

23 4,590,610

CLASS 400

56 4,589,784
61 4,589,785
124 4,589,786
145.2 4,589,787
187 4,589,788
195 4,589,789
322 4,589,790

CLASS 401

290 4,589,791

CLASS 403

11 4,589,792
13 4,589,793
187 4,589,794
233 4,589,795
266 4,589,796
372 4,589,797

CLASS 405

36 4,589,798
196 4,589,799
221 4,589,800
224 4,589,801
227 4,589,802
259 4,589,803
270 4,589,804

CLASS 408

21 4,589,805
72 R 4,589,806
205 4,589,807

CLASS 409

233 4,589,808

CLASS 411

166 4,589,809

CLASS 414

5 4,589,810
46 4,589,812
224 4,589,811
401 4,589,813
484 4,589,814
590 4,589,815
680 4,589,816
729 4,589,817
744 A 4,589,818
752 4,589,819

CLASS 415

2 R 4,589,820
111 4,589,821
170 A 4,589,822

CLASS 416

92 4,589,823
97 R 4,589,824

CLASS 417

290 4,589,825
368 4,589,826
423 R 4,589,827

CLASS 418

55 4,589,828
259 4,589,829

CLASS 419

9 4,590,033
13 4,590,034

CLASS 420

449 4,590,035

CLASS 422

13 4,590,036
116 4,590,037
142 4,590,038
150 4,590,039
156 4,590,040
165 4,590,041
186.06 4,590,042
189 4,590,043
191 4,590,044
216 4,590,045

CLASS 423

242 4,590,046
4,590,047
4,590,048
244 4,590,049
305 4,590,050
315 4,590,051
335 4,590,052
344 4,590,053
447.4 4,590,055
449 4,590,056
467 4,590,054
477 4,590,057
515 4,590,058
605 4,590,059

CLASS 424

1.1 4,590,060
7.1 4,590,061
19 4,590,062
4,590,063
49 4,590,064
4,590,065
52 4,590,066
54 4,590,067
70 4,590,069
78 4,590,070
81 4,590,068
85 4,590,071
93 4,590,072
114 4,590,073

CLASS 425

150 4,589,830
195 4,589,831
289 4,589,832
306 4,589,833
369 4,589,834
392 4,589,835
406 4,589,836
522 4,589,837
540 4,589,838
547 4,589,839
556 4,589,840

CLASS 426

5 4,590,075
61 4,590,077
62 4,590,076
113 4,590,078
265 4,590,079
441 4,590,080
448 4,590,081
535 4,590,082
557 4,590,083
4,590,084
582 4,590,085
602 4,590,086
603 4,590,087
621 4,590,088

CLASS 427

2 4,590,089
8 Re.32,151
34 4,590,090
53.1 4,590,091
68 4,590,092
79 4,590,093
82 4,590,094
96 4,590,095
109 4,590,096
154 4,590,097
244 4,590,098
296 4,590,099
327 4,590,100
350 4,590,101
374.1 4,590,102
387 4,590,103
389.9 4,590,104

CLASS 428

8 4,590,105
35 4,590,106
36 4,590,107
4,590,108
40 4,590,109
53 4,590,110
67 4,590,111
71 4,590,112
92 4,590,113
148 Re.32,152
171 4,590,114
174 4,590,115
182 4,590,116
212 4,590,117
215 4,590,118
216 4,590,119
247 4,590,120
258 4,590,121
260 4,590,122
316.6 4,590,123
339 4,590,124
349 4,590,125
4,590,126
405 4,590,127
411.1 4,590,128
425.1 4,590,129
446 4,590,130
516 4,590,131
614 4,590,132
653 4,590,133

CLASS 429

35 4,590,134
38 4,590,135
104 4,590,136

CLASS 430

24 4,590,137
25 4,590,138
45 4,590,139
102 4,590,140
108 4,590,141
138 4,590,142
163 4,590,143
273 4,590,144
281 4,590,145
4,590,146
286 4,590,147
303 4,590,148
325 4,590,149
372 4,590,150
409 Re.32,149
537 4,590,151
543 4,590,152
551 4,590,153
559 4,590,154
567 4,590,155

CLASS 431

170 4,589,841
301 4,589,842

CLASS 432

59 4,589,843
223 4,589,844
239 4,589,845

CLASS 433

30 4,589,846
126 4,589,847
140 4,589,848

CLASS 434

258 4,589,849

CLASS 435

5 4,590,156
7 4,590,157
34 4,590,158
68 4,590,159
78 4,590,160
96 Re.32,153
108 4,590,161
172.3 4,590,162
317 4,590,163

CLASS 436

15 4,590,164
49 4,590,165
96 4,590,166
162 4,590,167
518 4,590,168
523 4,590,169
533 4,590,170

CLASS 440

61 4,589,850
88 4,589,851
89 4,589,852

CLASS 446

123 4,589,853
223 4,589,854

CLASS 455

166 4,590,611
190 4,590,612
200 4,590,613
270 4,590,614
304 4,590,615
319 4,590,616
328 4,590,617
343 4,590,618
612 4,590,619
614 4,590,620

CLASS 464

36 4,589,855
111 4,589,856
145 4,589,857

CLASS 474

12 4,589,858
148 4,589,859
161 4,589,860
178 4,589,861

CLASS 493

183 4,589,862
471 4,589,863

CLASS 494

20 4,589,864
26 4,589,865
54 4,589,866

CLASS 501

25 4,590,171

CLASS 502

160 4,590,172
204 4,590,173
219 4,590,174
249 4,590,175
307 4,590,176
328 4,590,177

CLASS 514

18 4,590,178
25 4,590,179
46 4,590,180
54 4,590,181
80 4,590,182
163 4,590,183
167 4,590,184
183 4,590,185
202 4,590,186
211 4,590,187
4,590,188
212 4,590,189
221 4,590,190
4,590,191
231 4,590,192
247 4,590,194
252 4,590,195
253 4,590,193
4,590,196
267 4,590,197
336 4,590,198
343 4,590,199
357 4,590,200
359 4,590,201
392 4,590,202
397 4,590,203
424 4,590,204
438 4,590,205
456 4,590,206
470 4,590,207
500 4,590,208
547 4,590,209
548 4,590,210
594 4,590,211
629 4,590,212
653 4,590,213
702 4,590,214
729 4,590,215

CLASS 518

700 4,590,216
716 4,590,217

CLASS 521

50 4,590,218
51 4,590,219
68 4,590,220
85 4,590,221
88 4,590,222
118 4,590,223
155 4,590,224
167 4,590,225
174 4,590,226

CLASS 522

85 4,589,964

CLASS 523

130 4,590,227
131 4,590,228
143 4,590,229

CLASS 524

77 4,590,230
100 4,590,231

178 4,590,232
357 4,590,233
413 4,590,234
439 4,590,235
460 4,590,236
480 4,590,237
745 4,590,238

CLASS 525

92 4,590,239
123 4,590,240
132 4,590,241
183 4,590,242
184 4,590,243
332.3 4,590,244
504 4,590,245

CLASS 526

106 4,590,246
124 4,590,247
228 4,590,248
287 4,590,249
301 4,590,250
311 4,590,251
329.7 4,590,252

CLASS 528

14 4,590,253
49 4,590,254
71 4,590,255
93 4,590,256
176 4,590,257
189 4,590,258
272 4,590,259
328 4,590,260
488 4,590,261

CLASS 530

317 4,590,004
330 4,590,003
386 4,590,002
394 4,590,001
500 4,590,262

CLASS 534

558 4,590,263

CLASS 536

18.2 4,590,264
63 4,590,265
69 4,590,266

CLASS 544

27 4,590,267
58.2 4,590,074
114 Re.32,154
121 4,590,268
276 4,590,269
320 4,590,270
324 4,590,271
335 4,590,272
363 4,590,273
396 4,590,274

CLASS 546

62 4,590,275
75 4,590,276
105 4,590,277
281 4,590,278
345 4,590,279

CLASS 548

491 4,590,280
545 4,590,281

CLASS 549

453 4,590,282
477 4,590,284
488 4,590,283
509 4,590,285
526 4,590,286

CLASS 556

53 4,590,287
112 4,590,288
188 4,590,289

CLASS 558

73 4,590,017
264 4,590,008
323 4,590,011
332 4,590,013
341 4,590,010

CLASS 560

56 4,590,290
64 4,590,291
124 4,590,292
233 4,590,293
247 4,590,294
332 4,590,009

CLASS 562

478 4,590,295

CLASS 568

366 4,590,296
374 4,590,297
387 4,590,298
415 4,590,299
616 4,590,300
633 4,590,301
665 4,590,302
728 4,590,303
766 4,590,304
771 4,590,305
804 4,590,306
4,590,307
812 4,590,308
842 4,590,309
4,590,310
852 4,590,311
861 4,590,312
907 4,590,313
909 4,590,314

CLASS 570

127 4,590,315
150 4,590,316
220 4,590,317
4,590,318

CLASS 585

274 4,590,319
324 4,590,320
415 4,590,321
4,590,322
417 4,590,323
444 4,590,324
512 4,590,325

CLASS 604

85 4,589,867
96 4,589,868
119 4,589,869
210 4,589,870
240 4,589,871
246 4,589,872
265 4,589,873
349 4,589,874
351 4,589,875
385 R 4,589,876
4,589,877
392 4,589,878
411 4,589,879
892 4,589,880

CLASS 623

6 4,589,147
11 4,589,881
4,589,882
22 4,589,883

CLASSIFICATION OF DESIGNS

D2— 430 283,844
D3— 30.1 283,845
36 283,846
D4— 120 283,847
283,848
283,849
283,850
130 283,851
136 283,852
D6— 308 283,853
318 283,854
333 283,855
349 283,856
364 283,857
366 283,858
463 283,859
471 283,860
283,861
473 283,862
477 283,863
484 283,864
283,865
D7— 13 283,866
36 283,867
74 283,868
76 283,869
D8— 36 283,870
98 283,871
394 283,872
D9— 337 283,873
D10— 6 283,874
38 283,875
106 283,876
126 283,877
D11— 90 283,878
152 283,879
164 283,880
D12— 12 283,881
91 283,882
107 283,883
130 283,884
145 283,885
179 283,886
181 283,887
D13— 8 283,888
D14— 53 283,889
55 283,890
59 283,891
68 283,892
114 283,893
283,894
283,895
D15— 5 283,896
79 283,897
D16— 42 283,898
D17— 20 283,899
D18— 13 283,900
D19— 50 283,901
76 283,902
D20— 4 283,903
D21— 13 283,904
74 283,905
178 283,906
212 283,907
230 283,908
D22— 13 283,909
26 283,910
D23— 139 283,911
283,912
163 283,913
D24— 17 283,914
21 283,915
283,916
25 283,917
27 283,918
34 283,919
47 283,920
52 283,921
54 283,922
D25— 49 283,923
D26— 283,924
61 283,925
63 283,926
110 283,927
283,928
283,929
D27— 48 283,930
D28— 2 283,931
D32— 68 283,932
283,933
69 283,934
D34— 39 283,935
D47— 6 R 283,936
D99— 28 283,937
34 283,938
283,939

GEOGRAPHICAL INDEX

OF RESIDENCE OF INVENTORS

(U.S. States, Territories and Armed Forces, the Commonwealth of Puerto Rico, and the Canal Zone)

Alabama	1	Kentucky	21	Oregon	41
Alaska	2	Louisiana	22	Pennsylvania	42
American Samoa	3	Maine	23	Puerto Rico	43
Arizona	4	Maryland	24	Rhode Island	44
Arkansas	5	Massachusetts	25	South Carolina	45
California	6	Michigan	26	South Dakota	46
Canal Zone	7	Minnesota	27	Tennessee	47
Colorado	8	Mississippi	28	Texas	48
Connecticut	9	Missouri	29	Utah	49
Delaware	10	Montana	30	Vermont	50
District of Columbia	11	Nebraska	31	Virginia	51
Florida	12	Nevada	32	Virgin Islands	52
Georgia	13	New Hampshire	33	Washington	53
Guam	14	New Jersey	34	West Virginia	54
Hawaii	15	New Mexico	35	Wisconsin	55
Idaho	16	New York	36	Wyoming	56
Illinois	17	North Carolina	37	U.S. Air Force	57
Indiana	18	North Dakota	38	U.S. Army	58
Iowa	19	Ohio	39	U.S. Navy	59
Kansas	20	Oklahoma	40		

(First number in listing denotes location according to above key. Refer to patent number in body of the Official Gazette to obtain details as to inventor name, location, etc.)

PATENTS

01 : 4,589,778	4,589,608	4,590,467	4,590,299	4,589,180	4,590,213
4,589,880	4,589,630	4,590,468	4,590,378	4,589,185	4,590,463
4,589,882	4,589,632	4,590,472	4,590,562	4,589,204	4,590,540
4,589,904	4,589,655	4,590,492	4,590,578	4,589,224	4,590,590
4,590,535	4,589,661	4,590,497	10 : 4,589,619	4,589,228	4,590,613
04 : 4,589,195	4,589,678	4,590,503	4,589,864	4,589,235	19 : 4,589,294
4,589,307	4,589,686	4,590,510	4,589,909	4,589,240	4,589,419
4,589,386	4,589,688	4,590,521	4,589,999	4,589,272	4,589,436
4,589,499	4,589,689	4,590,527	4,590,015	4,589,303	4,589,563
4,589,502	4,589,704	4,590,536	4,590,054	4,589,312	4,589,578
4,589,547	4,589,711	4,590,551	4,590,205	4,589,313	4,589,709
4,589,616	4,589,737	4,590,557	4,590,235	4,589,401	4,590,246
4,589,721	4,589,774	4,590,581	4,590,252	4,589,412	4,590,469
4,590,024	4,589,806	4,590,589	4,590,274	4,589,467	20 : 4,590,481
4,590,389	4,589,830	4,590,598	11 : 4,590,569	4,589,514	21 : 4,589,241
4,590,585	4,589,835	4,335,570	12 : 4,589,163	4,589,546	4,589,458
4,590,600	4,589,846	4,456,527	4,589,181	4,589,551	4,589,584
4,590,601	4,589,852	08 : 4,589,249	4,589,186	4,589,558	4,589,658
05 : 4,589,355	4,589,854	4,589,404	4,589,328	4,589,597	4,590,337
06 : 4,589,153	4,589,881	4,589,523	4,589,388	4,589,639	22 : 4,589,315
4,589,154	4,589,895	4,589,555	4,589,522	4,589,668	4,589,410
4,589,158	4,589,907	4,589,700	4,589,556	4,589,684	4,589,614
4,589,171	4,589,913	4,589,776	4,589,570	4,589,725	4,589,971
4,589,176	4,589,925	4,589,875	4,589,669	4,589,728	4,590,001
4,589,194	4,589,939	4,589,950	4,589,741	4,589,849	4,590,010
4,589,212	4,589,962	4,589,972	4,589,743	4,589,874	4,590,012
4,589,253	4,589,964	4,589,981	4,589,798	4,589,879	4,590,013
4,589,287	4,589,976	4,590,061	4,589,824	4,589,890	4,590,292
4,589,298	4,589,977	4,590,520	4,590,047	4,589,945	23 : 4,589,238
4,589,300	4,589,986	4,590,526	4,590,158	4,589,956	24 : Re.32,152
4,589,314	4,590,042	09 : 4,589,164	4,590,383	4,590,037	4,589,229
4,589,317	4,590,043	4,589,175	4,590,394	4,590,107	4,589,321
4,589,323	4,590,057	4,589,187	4,590,476	4,590,159	4,589,342
4,589,380	4,590,071	4,589,245	4,590,516	4,590,212	4,589,402
4,589,407	4,590,091	4,589,353	4,590,545	4,590,250	4,589,610
4,589,417	4,590,100	4,589,411	4,590,570	4,590,261	4,589,666
4,589,420	4,590,163	4,589,416	4,590,617	4,590,324	4,589,685
4,589,421	4,590,169	4,589,477	4,590,618	4,590,344	4,589,692
4,589,460	4,590,190	4,589,564	13 : 4,589,246	4,590,397	4,589,772
4,589,464	4,590,218	4,589,599	4,589,349	4,590,423	4,589,817
4,589,494	4,590,269	4,589,631	4,589,408	4,590,431	4,589,933
4,589,501	4,590,279	4,589,746	4,589,462	4,590,502	4,590,166
4,589,509	4,590,282	4,589,804	4,589,716	4,590,576	4,590,210
4,589,513	4,590,301	4,589,826	15 : 4,589,405	18 : Re.32,151	4,590,331
4,589,524	4,590,332	4,589,870	16 : 4,589,459	4,589,320	4,590,418
4,589,526	4,590,345	4,589,888	4,589,667	4,589,346	4,590,419
4,589,540	4,590,376	4,589,900	4,589,690	4,589,373	4,590,505
4,589,560	4,590,377	4,589,965	4,589,782	4,589,439	4,590,596
4,589,562	4,590,422	4,590,073	4,590,080	4,589,691	25 : 4,589,275
4,589,565	4,590,440	4,590,121	4,590,357	4,589,693	4,589,278
4,589,590	4,590,444	4,590,214	4,590,482	4,589,905	4,589,282
4,589,595	4,590,446	4,590,255	17 : Re.32,155	4,589,968	4,589,283
4,589,601	4,590,457	4,590,290	4,589,179	4,590,196	4,589,322

4,589,418
4,589,484
4,589,548
4,589,598
4,589,713
4,589,726
4,589,745
4,589,752
4,589,868
4,589,954
4,590,006
4,590,101
4,590,108
4,590,120
4,590,168
4,590,263
4,590,368
4,590,400
4,590,432
4,590,436
4,590,437
4,590,448
4,590,460
4,590,573
4,590,602
26 : 4,589,148
4,589,178
4,589,211
4,589,227
4,589,239
4,589,301
4,589,318
4,589,385
4,589,441
4,589,475
4,589,496
4,589,519
4,589,536
4,589,572
4,589,676
4,589,733
4,589,783
4,589,796
4,589,807
4,589,809
4,589,818
4,589,838
4,589,862
4,589,922
4,589,955
4,590,031
4,590,133
4,590,187
4,590,204
4,590,211
4,590,220
4,590,222
4,590,224
4,590,225
4,590,241
4,590,280
4,590,297
4,590,300
4,590,327
4,590,364
4,590,413
4,590,429
4,590,449
4,590,607
27 : 4,589,223
4,589,231
4,589,236
4,589,333
4,589,376
4,589,497
4,589,571
4,589,576
4,589,628
4,589,714
4,589,800

4,589,822
4,589,872
4,589,961
4,589,983
4,589,994
4,590,014
4,590,109
4,590,122
4,590,351
4,590,392
4,590,395
4,590,426
4,590,511
4,590,586
29 : 4,589,151
4,589,263
4,589,574
4,589,942
4,590,011
4,590,072
4,590,085
4,590,243
4,590,244
4,590,475
30 : 4,589,344
31 : 4,589,332
4,590,181
33 : 4,589,466
4,589,861
4,590,379
4,590,391
4,590,434
4,590,478
34 : 4,589,213
4,589,470
4,589,588
4,589,712
4,589,727
4,589,729
4,589,739
4,589,815
4,589,843
4,589,877
4,589,883
4,589,902
4,589,919
4,589,982
4,589,991
4,589,993
4,590,002
4,590,036
4,590,050
4,590,051
4,590,062
4,590,064
4,590,065
4,590,069
4,590,075
4,590,082
4,590,084
4,590,088
4,590,102
4,590,114
4,590,177
4,590,201
4,590,284
4,590,286
4,590,288
4,590,298
4,590,310
4,590,320
4,590,321
4,590,322
4,590,323
4,590,399
4,590,402
4,590,403
4,590,441
4,590,453
4,590,455

4,590,470
4,590,479
4,590,480
4,590,507
4,590,513
4,590,594
4,590,620
35 : 4,589,398
4,589,399
4,589,490
4,590,427
36 : Re.32,149
4,589,146
4,589,150
4,589,190
4,589,193
4,589,198
4,589,202
4,589,207
4,589,219
4,589,233
4,589,259
4,589,324
4,589,374
4,589,430
4,589,463
4,589,471
4,589,539
4,589,575
4,589,583
4,589,626
4,589,645
4,589,647
4,589,651
4,589,652
4,589,653
4,589,736
4,589,759
4,589,765
4,589,808
4,589,867
4,589,937
4,589,938
4,589,943
4,590,074
4,590,076
4,590,090
4,590,095
4,590,125
4,590,130
4,590,138
4,590,151
4,590,171
4,590,183
4,590,194
4,590,231
4,590,257
4,590,259
4,590,303
4,590,307
4,590,315
4,590,333
4,590,335
4,590,356
4,590,367
4,590,461
4,590,477
4,590,501
4,590,519
4,590,550
4,590,554
4,590,567
4,590,574
4,074,176
37 : 4,589,266
4,589,267
4,589,319
4,589,361
4,589,448
4,589,715

4,589,719
4,589,775
4,589,873
4,590,271
4,590,465
4,590,606
38 : 4,589,250
39 : 4,589,161
4,589,165
4,589,210
4,589,286
4,589,366
4,589,372
4,589,384
4,589,409
4,589,415
4,589,425
4,589,446
4,589,447
4,589,457
4,589,478
4,589,520
4,589,535
4,589,549
4,589,550
4,589,582
4,589,635
4,589,644
4,589,663
4,589,687
4,589,803
4,589,823
4,589,856
4,589,876
4,589,892
4,589,899
4,589,927
4,589,934
4,589,940
4,589,980
4,589,990
4,590,007
4,590,008
4,590,017
4,590,056
4,590,059
4,590,063
4,590,066
4,590,089
4,590,229
4,590,251
4,590,293
4,590,304
4,590,317
4,590,318
4,590,408
4,590,471
40 : 4,589,485
4,589,488
4,589,492
4,589,498
4,589,569
4,589,801
4,589,814
4,589,957
4,590,039
4,590,040
4,590,174
41 : 4,590,407
42 : 4,589,147
4,589,188
4,589,200
4,589,220
4,589,237
4,589,255
4,589,309
4,589,348
4,589,406
4,589,437
4,589,465

4,589,507
4,589,561
4,589,585
4,589,586
4,589,657
4,589,718
4,589,896
4,589,898
4,589,928
4,589,932
4,589,978
4,589,985
4,590,022
4,590,048
4,590,105
4,590,137
4,590,172
4,590,202
4,590,240
4,590,254
4,590,276
4,590,285
4,590,312
4,590,313
4,590,329
4,590,358
4,590,386
4,590,388
4,590,393
4,590,401
4,590,404
4,590,539
4,590,546
4,590,575
4,590,604
43 : 4,590,275
44 : 4,590,488
45 : 4,589,365
4,589,580
4,589,648
4,589,884
4,590,124
4,590,262
47 : 4,589,252
4,589,367
4,589,699
4,589,834
4,589,966
4,590,032
4,590,058
4,590,099
4,590,156
4,590,265
4,590,544
4,590,610
48 : 4,589,160
4,589,196
4,589,201
4,589,248
4,589,257
4,589,276
4,589,281
4,589,285
4,589,341
4,589,424
4,589,427
4,589,434
4,589,435
4,589,482
4,589,483
4,589,486
4,589,487
4,589,491
4,589,493
4,589,495
4,589,503
4,589,566
4,589,615
4,589,621
4,589,625

4,589,717
4,589,781
4,589,790
4,589,820
4,589,963
4,589,979
4,589,998
4,590,018
4,590,078
4,590,326
4,590,336
4,590,370
4,590,416
4,590,439
4,590,458
4,590,462
4,590,473
4,590,504
4,590,552
4,590,556
4,590,579
4,590,592
4,590,593
49 : 4,589,174
4,589,225
4,589,226
4,589,423
4,589,454
4,589,508
4,589,624
4,589,973
4,590,041
50 : 4,590,094
4,590,258
51 : 4,589,192
4,589,270
4,589,428
4,589,656
4,589,664
4,589,789
4,590,264
4,590,278
4,590,425
4,590,583
4,590,608
53 : Re.32,150
4,589,221
4,589,356
4,589,357
4,589,542
4,589,611
4,589,613
4,589,622
4,589,670
4,589,681
4,589,770
4,590,003
54 : 4,590,216
4,590,314
55 : 4,589,243
4,589,280
4,589,308
4,589,337
4,589,378
4,589,383
4,589,600
4,589,629
4,589,812
4,589,813
4,589,831
4,589,851
4,589,894
4,590,067
4,590,106
4,590,296
4,590,349
4,590,538
4,590,558
4,590,603

DESIGN PATENTS

06 : 283,859
283,866
283,876
283,877
283,886
283,889
283,896
283,913
283,935
283,937
08 : 283,851
283,894

09 : 283,853
283,895
283,905
283,934
12 : 283,888
17 : 283,857
283,868
283,922
283,923
19 : 283,903
24 : 283,899

25 : 283,926
26 : 283,872
283,881
283,908
283,921
27 : 283,904
30 : 283,878
31 : 283,846
34 : 283,860
283,861
283,879

283,890
283,900
283,925
283,927
283,928
283,929
35 : 283,898
36 : 283,855
283,856
283,862
283,869

283,902
283,918
283,936
283,938
283,939
37 : 283,863
283,864
283,865
283,914
39 : 283,892
40 : 283,847

283,848
283,849
283,850
42 : 283,931
45 : 283,909
48 : 283,845
51 : 283,917
53 : 283,844
55 : 283,884
283,932
283,933

U.S. GOVERNMENT PRINTING OFFICE : O—1986

CHANGE OF ADDRESS FORM

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

Mail this form to: NEW ADDRESS

Superintendent of Documents
Government Printing Office SSOM
Washington, D.C. 20402

Attach last subscription label here.

SUBSCRIPTION ORDER FORM

SUBSCRIPTION ORDER FORM

ENTER MY SUBSCRIPTION TO:

@ $ Domestic; @ $ Foreign.

NAME—FIRST, LAST

COMPANY NAME OR ADDITIONAL ADDRESS LINE

STREET ADDRESS

CITY | STATE | ZIP CODE

PLEASE PRINT OR TYPE

(or) COUNTRY

☐ Remittance Enclosed (Make checks payable to Superintendent of Documents)

☐ Charge to my Deposit Account No. .....

MAIL ORDER FORM TO:
Superintendent of Documents
Government Printing Office
Washington, D.C. 20402

U.S. DEPARTMENT OF COMMERCE
Malcolm Baldrige, *Secretary*
PATENT AND TRADEMARK OFFICE
Donald J. Quigg, *Commissioner*